Policy risk and Stock Market volatility in China

A thesis

submitted in partial fulfilment

of the requirements for the Degree of

Doctor of Philosophy in Finance

at

Lincoln University

by

Dekui Jia

Lincoln University

2019

Abstract

Policy risk and Stock Market volatility in China

The policy-driven feature of China's stock market induces a debatable argument that political interference should be responsible for the sharp fluctuations of the stock markets because of discretionary changes in government policies. Furthermore, Chinese economy is currently undergoing significant restructuring and transition which need strong support from the capital market, and a stable and healthy stock market is believed to be a key part of the reform process. Therefore, the investigation of the relationship between the risk arisen from government policy and the volatility in the stock markets is of particular importance to both policy makers, investors and academics.

Previous studies predominantly emphasize on exploring the causes of government interventions and providing some policy suggestions, and no academic works shed light on the relationship between policy risk and the stock market volatility because it is difficult to measure the policy-related risk. Besides, most existing studies only focus on exploring the effects of conventional government policy, such as monetary policy, fiscal policy and regulatory policy, on the stock markets. But in practice, the official remarks, comments, and announcements always have significant impacts on investors' expectation and further impose great influences on the operation of the stock markets. It is critical to take these factors into account when investigating the causes of the frequent volatile movement in China's stock markets.

In this study, based on the frequency of news articles published in the 5 selected sample official newspapers, policy risk index (PRI) is first developed to measure the policy risk and/or uncertainty in China's stock markets. Subsequently, to identify the impact of policy risk on the volatility of the stock markets, multivariate regression models including the PRI as an important explanatory variable are estimated in terms of the different Chinese market conditions such as bullish and bearish time.

The empirical results show that policy risk specified by the PRI has a significant effect on the overall volatility of China's stock markets, and the effect of PRI on upward volatility is greater than on downward volatility. In different market conditions, the PRI has a significant effect on the volatility in both the bull and bear market, and the effect of the PRI in the bull market is greater than in the bear market. Moreover, the effect of the PRI on downward

volatility is greater than the upward volatility in the bull market; however, the effect of the PRI on upward volatility is greater than on the downward volatility in bear market.

The empirical results suggest that the regulatory authorities need to take a combination of measures to prevent the stock markets from being negatively influenced by policy-related risk. First, direct policy intervention should be completely avoided. Second, regulators need to be extremely cautious while making any comments with a subjective attitude about the current valuation of the stock markets. Third, it is crucial for authorities to improve the transparency of regulatory activities in the stock markets, and the reversed pressure transmission from investors to regulators need to be eliminated. Additionally, further measures need to be taken for deepening the reform of regulatory system, improving the quality of listed companies, and enhancing the stock market supervisions and regulations in China.

Keywords: Policy Risk, Stock Market Volatility, Policy-driven Market, PRI.

Acknowledgements

It was a great learning experience to study for my second PhD degree after being a lecturer for over 10 years.

During my thesis journey, there are many people who have provided me continuous support and help. First and foremost, I would like to express my sincere gratitude to my supervisor, Prof. Christopher Gan, for his guidance and support. His patience and constructive comments made it possible for me to continuously improve my research quality as well as academic writing.

I am extremely grateful to my associate supervisor, Dr. Baiding Hu, for his consistent support and insightful comments. His invaluable insights and suggestions incentivised me to keep improving my study from various perspectives.

I would also like to express my sincere appreciation to the staff of the Faculty of Agribusiness and Commerce as well as the team of Library Learning and Teaching at Lincoln University, for their great support and assistance at different stages of my study.

Many thanks are due to my peers who attended my presentation and provided some useful suggestions to improve my research. My big "thank you" also goes to one of my graduate students, Feng Qi, for her kind help in data collection.

Finally, I would like to say "thank you" to my family, especially my wife Lucy Liu and lovely daughter Emily Jia, for all their support and everything they have done for me.

Table of Contents

List of Tables

List of Figures

ABBREVIATIONS

ADF	Augmented Dickey-Fuller
ARIMA	Autoregressive Integrated Moving Average Model
ARMA	Auto-Regressive and Moving Average Model
CA	Content Analysis
CBN	China Business News
CBRC	China Banking Regulatory Commission
CCNFD	China Core Newspapers Full-text Database
CIRC	China Insurance Regulatory Commission
CNKI	China National Knowledge Infrastructure
CPI	Consumer Price Index
CSJ	China Securities Journal
CSFC	China Securities Finance Corporation
CSRC	China Securities Regulatory Commission
DA	Descriptive Analysis
DGM	Dynamic Game Model
ECB	European Central Bank
ED	Economic Daily
EMH	Efficient Market Hypothesis
EPU	Economic Policy Uncertainty
EPUA	Economic Policy Uncertainty in USA
EPUC	Economic Policy Uncertainty in China
ER	Exchange Rate
ESM	Event Study Method
FN	Financial News
FT	Full Text in Chinese
GARCH	Generalized Auto-Regressive Conditional Heteroskedasticity
GD	Guangming Daily
GMM	Generalized Method of Moments
INF	Inflation Rate

IP	Industrial Production
IPO	Initial Public Offering
IR	Interest Rate
KTS	Key Term Set
KTL	Key Term Library
KY	Key Words in Chinese
LPM	Linear Probability Model
LS	Laboratory Simulation
LY	Chinese Name of Newspaper
MS	Money Supply
MVR	Multivariate Regression
NE	Natural Experiment
NSAPM	Nonlinear Stochastic Asset Pricing Model
PBC	People's Bank of China
PD	People's Daily
PR	Panel Regression
PRI	Policy Risk Index
REG	Retrieval Expression Grammar
RS	Retail Sales
SHCI	Shanghai Composite Index
SCMP	South China Morning Post
SD	Securities Daily
SE	Share's Earnings
SoS	State-owned Shares
SSE	Shanghai Stock Exchange
SSN	Shanghai Securities News
SSVS	Bayesian Stochastic Search Variable Selection
ST	Securities Times
SV	Share's Trading Volume
SVAR	Structural Vector Auto-Regression
SVM	Support Vector Machine

TMT	Text Mining Technology
TST	Transaction Stamp Tax
UR	Univariate Regression
VAR	Vector Auto-Regression
VECM	Vector Error Correction Model
XNA	Xinhua News Agency

Chapter 1
Introduction

1.1 Research background

For decades, understanding the characteristics, causes and consequences of stock market volatility has been at the heart of modern economics and finance. In emerging stock markets, the imbalance of stock supply and demand, irrational investors and policy uncertainty are the main drivers of market fluctuations other than fundamentals such as changes in shares' dividends and earnings, which have very important impacts on equity prices in most developed markets.

The stock exchanges in Shanghai and Shenzhen were established in 1990 and 1991, respectively. After 25 years of development, there are already 2827 listed companies in China's stock markets and, by the end of 2015, the total market capitalization was close to 8.5 trillion US$ (the ratio of stock market capitalization to GDP is around 78.5%).[1]

In practice, stock markets are inevitably affected by political interference occasionally across the world. In China's stock markets, it is not uncommon to observe severe fluctuations because of discretionary changes in government policies. As a result, there is a continuous argument that the government plays a dominant role in the stock markets that are supposed to be free of political interference. Further, many commentators argue that policy makers should be responsible for triggering stock market volatility as it is undoubtedly considered a perfect policy-driven market (Heilmann, 2002; Wang & Ye, 2011; Xiang & Wang, 2004). Zou et al.'s (2000) empirical results suggest that government policy is the foremost cause of the stock market volatility. According to Wang et al. (2012), government policies are the major factor in the stock market volatility; their empirical results show that a 69.5 percent of the stock market volatility in China can be explained by the policy-related factors[2].

The argument has become even more debated since the latest volatility in the stock market, which started in March 2014 in China's A-share market. To prevent the stock market from crashing, in early July 2015, China's policy makers launched the most heavy-handed intervention in 25 years[3]. As reported by *Global Finance* on July 4, 2015, Chinese regulatory

[1] Source: Wind Economic & Financial Database.
[2] Wang, M. T., Lu, L., & Song, K. (2012).Impacts of policy factors on volatility of stock markets, *Journal of Management Sciences in China*, 15(12), p. 47.
[3] Source: Brookings News. Website: http://www.brookings.edu/research/opinions/2015/07/13-china-stock-market-kroeber

authorities froze IPOs, suspended trading in shares accounting for 40% of market capitalization, forced state-owned brokers to promise to buy and hold shares until the index reached a higher level, mobilized state-controlled funds to purchase equities, cracked down on "malicious" short-sellers in the futures market, and promised unlimited liquidity support from the central bank[4]. Not surprisingly, most of the market-rescue measures taken by the Chinese government caused more intense debate about whether the stock market should be heavily influenced and intervened in by policy makers from the central government. Some critics insist that it was the government that directed the stock market disaster in 2015 whereas regulators claim that margin credit, malicious shorting and irrational selling of retail investors were the main causes of the severe shock in the stock market (Cui & Yi, 2016; Ye, 2015). For some retail investors and researchers, it is undoubtedly true that the risks caused by government policies, to a large extent, account for the sharp fluctuations in China's stock market. For example, He et al. (2013) claim that government policies are still believed to be the major cause of the stock market volatility in China. One news article in the *New Financial Outlook* states that policy-related risk is even more likely to cause abnormal fluctuations in China's A-share market during the period 2015 to 2016 compared with several years ago[5],

Further increase in criticism of regulators occurred when the Chinese stock market experienced another steep sell-off in January 2016; trading was halted on 4 and 7 January 2016 according to the newly introduced "circuit breaker" policy, which was subsequently suspended after the mechanism sparked sharp falls in a volatile market[6]. As a result, officials from the China Securities Regulatory Commission (CSRC) had to admit that the stock market slump in January 2016 was partly caused by the circuit breaker as 'it didn't work as anticipated based on actual situations'[7].

The Chinese economy is undergoing significant restructuring and transition that need strong support from the capital market, therefore, it is vital that the regulators can ensure that the stock market is operating smoothly with minimal disruption by taking some effective regulatory measures such as monitoring market manipulation and investigating insider trading to create a fair and transparent market environment. Long-term healthy development of the stock market is believed to be a key part of the reform of economic restructuring by switching

[4] Source: www.brookings.edu.
[5] Liu, Z. A, More risk caused by the government's policy in China's A–share markets, *New Financial Outlook*, 23/05/2016.
[6] Source: Suspension of circuit breaker for avoiding disadvantages, China Securities Journal, 08/01/2016, http://finance.ifeng.com/a/20160108/14157035_0.shtml
[7] Source: China suspends market circuit breaker mechanism after stock market rout, Reuters Business News, 07/01/2016, http://in.reuters.com/article/China-stocks

to a more market-driven and efficient mechanism for the resource allocation in China[8]. In such circumstances, the frequent stock market crashes caused by policy-related risk (or uncertainty), to some extent, is a profound political issue for central government because of the possible lack of trust of a large number of small investors who are supposed to be protected by the rules and regulations set by the government. As a result, it is very necessary to investigate the degree and mechanism of the risks arising from government policies, as well as the relationship between the fluctuations and government interventions in China's stock market. Therefore, this study explores the impact of policy risk on stock market volatility in China. Policy risk refers to market uncertainty caused by unexpected regulatory activities, official comments or government policies, and the measurement of policy risk is the main focus of this study.

1.2 Related literature on China's policy-driven stock market

Previous related studies on China's stock market are mainly by domestic researchers and most studies prefer to use 'policy stock market' or 'policy-driven stock market' instead of 'policy risk in stock market' or 'policy uncertainty in stock market' possibly because of political concerns (Han & Tang, 2002; He, 2004; Hu, 2003; Zhang & Shi, 1998)[9].

First, there are different kinds of definition for the policy-driven market in the literature. Among the policies affecting stock markets, some economic policies may have important impacts on stock markets as well as the overall economy, but they should differ from the regulatory rules and policies implemented by authorities for market monitoring and regulating, which are supposed to significantly influence share prices (He, 2004).

Zhang and Shi (1998) explain 'policy-driven stock market' in both broad and narrow terms. In the broad perspective, a policy-driven stock market is defined as the stock market that is often politically influenced by government, In the narrower perspective, it is believed that too much interference from regulators leads to severe fluctuations in the stock market and so massive social costs. Chen (2002) considers a policy-driven market as the phenomenon of market movement caused by government policies, whereas Jiang and Xie (2007) claim that excessive intervention by government is a key feature of China's policy-driven stock market.

Secondly, researchers such as Han and Tang (2002), Wang and Ye (2011) and Yu (1998) attempt to provide explanations for the causes of the policy-driven stock market in China. The

[8] Source: Report on the Work of the Government (2015).
[9] It is the same as the Chinese government prefers to use 'laid-off' instead of 'unemployment' and 'group events' instead of 'mass riots' in official media.

authors argue that institutional deficiencies, government's multiple roles in the stock market, conflicting policy objectives, and discretionary regulations and policies, as well as systematic deviations in government decision-making, are considered the major causes of the policy-driven market.

Since its initiation, one characteristic of China's policy-driven stock market is that it is a market in which political calculations, policy missions and administrative interferences are more important than the dynamics of market competition in determining a share's price fluctuations (Heilmann, 2002). The regulation of China's stock market was oriented towards supporting state-owned enterprises, stabilizing the market operation, and providing an implicit guarantee for different kinds of investors. As a result, it is not uncommon to see that a high degree of intervention led by the government has been used to attempt to achieve different objectives (Han & Tang, 2002; Yu, 1998). Further, being simultaneously a participant and a regulator, the conflicting roles made "policy-driven effect" key factor affecting fluctuations of the stock market (Qiao & Zhan, 2002). Besides, the policy-driven market is rooted in administrative ways that are described as 'wade across the stream by feeling the way', used by the regulatory authorities in stabilizing the stock market (Wang & Ye, 2011). Therefore, discretionary policy operation always misleads the expectations of market participants and causes sharp movements in share prices; the inappropriate choice of policy timing brings more uncertainty into the stock market (Xiao, 2003).

Third, the relationship between the policies led by the government and the volatility of China's stock market has been empirically investigated. By investigating whether any important policy events took place in the 10 trading days before and after abnormal fluctuations of the stock index, Lv and Zhao (2000) find that there is significant correlation between policy events and stock market volatility, which shows that policy-driving is one of the main features of China's stock market. Xu and Li (2001) analyzed the impact of policy on the stock market by dividing policy events into long-term continuous events and short-term discrete events and reveal that there are positive correlations between continuous policy events and movement of China's stock market. Further, the short-term policy events have a greater impact on the stock market. Similarly, by analyzing the relationship between abnormal fluctuations of the Shanghai Composite Index (SHCI) and major policy-related events, Hu (2003) provides some evidence to support the view that there are significant effects of policy on the volatility of China's stock market.

Finally, some suggestions have been presented to improve the efficiency of the government's regulatory policies and, further, to keep the stock market free of severe fluctuations. In most domestic related studies, strengthening the government role as a stock market guardian, improving the regulatory system of the capital market, switching to a market-oriented supervisory style, and constructing a crisis response mechanism are necessary and crucial to lessen policy-driven effects on the volatility of share prices in China's stock market (see Han & Tang, 2002; Hu, 2003; Lv & Zhao, 2000; Wang & Ye, 2011; Xiao, 2003; Xu & Li, 2001). Wang et al. (2012) suggest that it is better for authorities to introduce new policies in a bear market than in a bull market since they find that policy factors explain more changes in stock market volatility in the bull market than in the bear market.

1.3 Problem statement

Previous studies on the policy-driven stock market in China mainly emphasize exploring the causes of government active intervention in the stock market and present some suggestions for authorities to improve regulatory efficiency (Han & Tang, 2002; Song et al., 1998; Wang & Ye, 2011). The most important policy implication from these studies is that the regulatory authority needs to make every effort to resolve issues caused by information asymmetry and reduce market uncertainty. Unfortunately, to the best of our knowledge, there are very few studies that shed light on the phenomenon of policy-driving in China's stock market from the perspective of risk management. On the one hand, inappropriate and excessive intervention by the Chinese government in the stock market leads to more unexpected severe fluctuations of share prices and exposes market participants to more uncertainty and possibly causes a huge loss of investor confidence. On the other hand, the inability to stabilize the capital market could substantially jeopardize the government's credibility as well as the effectiveness of financial resource allocation. Therefore, risk examination should be undertaken to increase our understanding of the relationship between policy-related risk and the stock market volatility.

In addition, existing studies focus only on estimating the degree of stock market volatility and explore the abnormal fluctuations caused by the government's policy or regulations (Chen & Fan, 2015; Lv & Zhao, 2000; Wang & Sun, 2004), but no studies pay attention to the methods used to measure the policy-related risk (or uncertainty) in the stock market. Policy risk normally involves potential losses for investors in the stock market because of unexpected changes in policies (or policy attitudes), which are always discrete policy implementations or reverse policy operations under some special circumstances. As a result, in most cases, it is

nearly impossible to quantify policy risk, which exacerbates the volatility of the stock market and brings about potential losses for market participants. In spite of this, it is still likely that one can find a proxy to measure the policy-related risk in the stock market; unfortunately, so far, no studies have attempted to address this subject and offer a good solution.

Previous empirical studies mostly employ the event study method to investigate the relationship between important events related to the government's regulatory activities and stock market fluctuations (Hu, 2003; Lv & Zhao, 2000; Xu & Li, 2001). It appears that no quantitative studies have systematically addressed the dynamic relations between policy-related risk or uncertainty and the volatility of share prices. In other words, the literature quantitatively examining the relationship between policy-related risk and stock market volatility is still scarce mainly because of the lack of the policy risk measurement.

Most importantly, no empirical studies have been conducted on the effects of policy comments on the stock market by analyzing the frequency and policy information of news articles reported by official securities newspapers. In the literature, one related research area in which researchers highlight the impacts of public information such as financial news, important economic events and firm-specific reports on the stock market, is very important, inspiring and instructive. For example, Niederhoffer (1971) analyzes the impacts of important events on the movements of stock prices and his results show that world events have a strong relationship with large changes in stock prices that demonstrate the same direction of change on the first and second day following the world events. Another study examines the relationship of news and stock prices using a predictive machine learning approach for financial news article analysis (Schumaker & Chen, 2009). Similarly, another study focuses on the relationship between the amount of daily news articles published by Dow Jones & Company and the stock market performance, including share returns and trading volume, in the US (Mitchell & Mulherin, 1994). However, those studies concentrate only on the content or number of news reports from business media rather than official media. It is known in financial markets that information from major official media has a greater impact on the expectations of market participants in China's stock market. Therefore, one main purpose of this study is to develop a method to measure policy risk in China's stock market by analyzing the public information on policy decisions, regulatory activities and the authorities' policy comments in official financial media.

Additionally, most studies on the policy-driven stock market in China cover only the time span from 1990 to 2012. However, since 2014, there have been significant changes in the

ways that shares are traded in China, mainly because of the introduction of margin trading and short selling. The latest stock market cycle from 2014 to 2016 involved some other proposed mechanisms such as the circuit breaker, which was introduced to suppress excessive trading and control market volatility, and some other restrictive rules over stock-index futures[10]. Thus, the effects of policy intervention on the stock market fluctuation might have some differences compared with the findings of previous studies. Unfortunately, no current empirical studies have undertaken this task.

In this study, policy risk is defined as the market uncertainty caused by unexpected regulatory activities, official comments or government policies. Different from the previous studies, this study attempts to explore the impact of policy risk on stock market volatility by developing a new news-based index (PRI, policy risk index) to measure the policy-related risk in China's stock market. The PRI developed in this study will be established following a process of article searching, policy-related information auditing and index computing based on the counts of news articles in selected major official newspapers from 2001 to 2016.

1.4 Research objectives and questions

China's stock market differs from most major markets globally with massive political intervention led by the government, central bank, regulators and propaganda chiefs. Accordingly, many commentators, such as Heilman (2002), Hu (2015), Qiao and Zhan (2002) and Wang and Ye (2011) argue that the risks caused by policy makers or regulatory agencies should account for the turbulence in the stock market. To assess this, the study focuses on measuring the risk (or uncertainty) caused by policy makers by developing the PRI using word queries from the public news database and the impact of policy risk on the volatility of China's stock market will be investigated using a multivariate regression model including the PRI variable.

The research objectives are:

1. To develop a new news-based index, PRI, to measure policy risk in China's stock markets.

2. To explore the impact of policy risk on the volatility of China's stock market based on the PRI.

[10] Source: CNBC Online News. Website: http://www.cnbc.com.

3. To investigate the different effects of policy risk on upward and downward volatility of stock index returns as well as the differences in the impact imposed by policy risk on stock market volatility between bull and bear markets in China.

4. To provide the policy implications to improve the efficiency of regulatory policies from the perspective of risk management.

To answer the research objectives, some key issues, such as the method of policy risk measurement and the impact estimation of policy risk on the stock markets, need to be resolved. The research questions are:

1. How to construct an index to measure the policy risk (or uncertainty) caused by policy authorities in China's stock markets?

2. Does the PRI developed in this study offer a good proxy for policy-related risk in China's stock market?

3. Is there a dynamic policy-driven effect on China's stock market over time?

4. To what extent can we say that China's stock market is a policy-driven market?

1.5 Importance of the study

To measure the policy-related risk in China's stock market, this study will develop a new PRI based on the frequency of news articles with policy comments in official newspapers collected from *China Core Newspapers Full-text Database (CCNFD).* The risk index created in this study is likely to offer a good proxy for policy-related risk and provide some useful information for stock market investors.

In addition, the findings based on the PRI will provide new evidence to confirm or refute the argument that it is the government that is responsible for the cyclical fluctuations in China's stock market.

The findings of this study will provide some policy implications distinctly from the perspective of risk management, for regulatory authorities or policy makers to improve regulation effectiveness as well as policy efficiency in China's stock market.

1.6 Contributions of the study

1.6.1 Construction of the PRI

One contribution of this study is to develop a new news-based index to measure policy risk. As discussed above, the first objective of this study focuses on developing a new PRI to measure the policy risk in China's stock markets. It relates to the literature based on the measurement of policy uncertainty or risk. For example, Bachmann et al. (2013) construct empirical measures of uncertainty based on business survey data from the US and Germany. Baker et al. (2016) develop an EPU index that draws on the frequency of newspaper references to economic policy uncertainty and other indicators. The PRI developed in this current study differs from Bachmann et al. (2013) in terms of method and data source selection. The data used to construct the PRI are mainly collected from official newspapers in Chinese. It also differs significantly from Baker et al. (2016), who constructed a similar EPU index for China using a set of keywords search on policy-related economic uncertainty in the *South China Morning Post (SCMP)*, which is an English-language newspaper published in Hong Kong. SCMP has very limited influence on investors' decisions in mainland China. Moreover, understanding the language system in China's official media is extremely important to discern the underlying policy makers' attitudes and intentions toward the stock market.

Most importantly, the PRI developed in this current study concentrates on offering a suitable proxy index to measure policy risk in the stock market. It is completely different from the EPU index of Baker et al. (2016), which is mainly aimed at quantifying economic policy uncertainty.

1.6.2 Estimation of the impact of policy risk on China's stock market

Another contribution of this study is to provide some new evidence whether China's stock market is a policy-driven market. One of the most important tasks of this study is to investigate the impact of policy risk on China's stock market based on a newly constructed PRI. The investigation is closely related to the literature mainly focused on the factors that cause volatility in the stock market. A number of studies, including Han and Wu (2003), Heilmann (2002), and Wu and Wu (2014) address the effects of GDP growth, inflation rate, interest rate, exchange rate, market structure, liquidity, trading regulations and company profit growth on stock markets. Comparatively, this study differs from previous literature in three aspects. First, the PRI will be included as an important explanatory variable in regression models to identify the impact of policy risk on stock market volatility. Second, the sample

period will be divided into bearish and bullish times to investigate any differences in the effects of policy risk on bull and bear markets. Apart from identifying the impact of policy risk on overall stock market volatility, the influence of the PRI on both upward and downward volatility will also be explored in this study.

1.7 Outline of the thesis

The thesis is organized as follows: Chapter 2 reviews the related literature on China's policy-driven stock market and presents an overview of the definition and measurement of policy risk (or uncertainty), determinants of stock market volatility, effects of public information on share prices along with a discussion of the impact of economic policy on fluctuations of stock markets. Chapter 3 discusses the effects of policy events on fluctuations of stock markets to justify whether all kinds of policy event can be equally treated to develop a proxy index to measure policy risk. Chapter 4 develops a new policy risk index to measure the risk and market uncertainty caused by regulatory policies in China's stock market. Chapter 5 presents the empirical results and discussion. Chapter 6 summarizes the study, proposes some policy implications, and identifies the study's limitations and some potential directions for future research.

Chapter 2

Literature Review

2.1 Introduction

This chapter reviews the literature on the definition and measurement of policy risk, and the impact of policy and public information on stock markets as well as studies on the policy-driven stock market in China. Section 2.2 presents an overview of previous studies' definitions of policy risk and the existing methods to indirectly measure policy risk or policy uncertainty. Section 2.3 reviews previous empirical findings of the effect of government policies, such as monetary policy, fiscal policy, regulatory policy and uncertainty of economic policy, on the volatility of stock markets across the world. Section 2.4 discusses the influence of public information, including firm-specific reports, economic news, important world events, market rumours and other information on stock markets. Section 2.5 presents the results of existing work on the policy-driven stock markets in China. Section 2.6 summarizes the results of previous empirical studies. Finally, Section 2.7 provides brief comments on related studies as well as the research ideas and core questions of this current study.

2.2 Understanding policy risk

2.2.1 What is policy risk?

There is no accurate definition or a consensus on the precise meaning of policy risk. Theoretically, risk means an exposure to a chance of gains or losses; in the social sciences, there are two prevailing definitions of risk: (1) risk is a situation or event where something of human value (including humans themselves) is at stake and where the outcome is uncertain; and (2) risk is an uncertain consequence of an event or an activity with respect to something that humans value (Aven & Renn, 2009). Thus, policy risk implies the potential to gain or lose something of value caused by policy-related uncertainty. For instance, policy risk related to stock markets can be defined as something that involves potential losses to investors because of unexpected changes in government policy.

Practically, risk and uncertainty are indiscriminately used to describe a situation involving unexpected results or a possibility of loss, injury, or other adverse or unwelcome circumstance. For example, Born and Pfeifer (2014) define uncertainty as "the dispersion of the economic shock distribution, i.e., a mean-preserving spread" (Born & Pfeifer, 2014, p. 68), and policy risk means uncertainty about fiscal and monetary policy.

In economics, Frank Knight distinguished risk and uncertainty in his work “Risk, Uncertainty, and Profit”: “Uncertainty must be taken in a sense radically distinct from the familiar notion of risk, from which it has never been properly separated. ... It will appear that a measurable uncertainty, or "risk" proper, as we shall use the term, is so far different from an immeasurable one that it is not in effect an uncertainty at all” (Knight, 2012, pp. 198-199).

In spite of this, policy risk and policy uncertainty are still inseparable while researchers discuss the uncertain effect relating to policy on economic individuals. Policy risk (or policy uncertainty) plays a crucial role in every aspect of the economy such as investment, consumption, and international trade (Pastor & Veronesi, 2012). In terms of stock markets, unexpected changes in policies usually account for a significant part of the instability in share prices. As a result, there are specific highlights and interpretations of policy risk in different research contexts. For instance, in a study of the effect of policy risk on the business cycle, Born and Pfeifer (2014) define policy risk as ‘the uncertainty about fiscal and monetary policy on the business cycle process’.

Most policy risk is caused by policies that are implemented to achieve some economic objective and affects potential benefits to investors only in an indeliberate way. However, some preemptive policy-related measures are operated to intentionally adjust the state of the current market and also influence the gains for investors. For example, in international trade, Holburn and Zelner (2010) argue that policy risk is the kind of risk that “a government will opportunistically alter policies to expropriate a firm's profits or assets” (Holburn & Zelner, 2010, p. 1290). Similarly, in China’s stock market, regulatory authorities often influence the operation of the market by administrative measures, official statements, changes in regulatory rules and other special policy instruments that ultimately become the sources of uncertainty or risk (Hu, 2003).

Therefore, the definition of policy risk in this study is defined as “a possibility of benefit change to investors because of unexpected government policy”. In terms of China’s stock market, policy risk refers to market uncertainty mainly caused by unexpected regulatory activities, changes in market regulations or trading rules, regulators’ comments and other regulatory policy-related information that possibly results in a benefit change for stock investors.

2.2.2 Measuring policy risk

Direct calculation of the benefit changes caused by policy-related uncertainty is impossible and there are no direct measures to estimate the size of policy risk. In previous studies, limited attempts have been made to measure policy risk or policy uncertainty and all the methods have been developed in an indirect way (Baker et al., 2014, 2016; Born & Pfeifer, 2014).

By building an index of EPU (economic policy uncertainty), Baker et al. (2016) attempt to find a feasible approach to quantify risk or uncertainty related to economic policies. According to the innovative way of policy uncertainty measurement, there are three components in the index. One component is based on counts of newspaper articles closely related to policy-related economic uncertainty. The second component measures the effects of oncoming expiry of federal tax code provisions over the next several years. Discrepancies in macroeconomic forecasting between different professionals are included as another important component of the EPU index. By exploring the relationship between Baker et al.'s (2016) EPU index and some economic or financial variables, most empirical research results show that the EPU index is a good proxy for measuring economic policy uncertainty in the US (Jin et al., 2014; Karnizova & Li, 2014; Olds, 2015; Sum, 2012, 2013). Apart from the EPU index for the US, Baker et al. (2016) also construct similar indices for 14 other countries, including Canada, UK, Germany, France, China, and Russia, based on news articles and selected keywords[11].

Differing from the indirect approach used by Baker et al. (2016), Born and Pfeifer (2014) try to separate the pure uncertainty effect caused by time-varying volatility by calculating the impulse response function to uncertainty shocks on the condition that the realization of the level shocks remains constant. In their study, an increase in the respective shock's volatility of two standard deviations is used to measure the uncertainty caused by policies.

To the best of our knowledge, there are no studies related to the measurement of policy risk other than Baker et al. (2016) and Born & Pfeifer (2014). Thus, the question about how to measure policy risk, especially in the stock markets, remains unresolved.

2.3 The impact of government policy on stock markets

In practice, government economic policy, such as money supply, interest rate, government expenditure, taxation, and regulatory rules including laws, has a remarkable, widespread

[11] The detailed data of those indices are available online and normally updated monthly. Website: http://www.policyuncertainty.com/

effect on the operation of stock markets because economic individuals, such as equity investors, who make their economic decisions based on expectations of the future policy environment (Wang et al., 2012). Thus, even market-benevolent policy makers could produce a higher risk by an increasing environment of uncertainty about the government's future economic policy decisions (Brogaard & Detzel, 2015). As documented in the well-known general equilibrium model of Tobin (1969), there are some important relationships between stock returns and government policies such as monetary and fiscal policy. In past decades, these concerns have been evidentially confirmed by studies such as Apergis (2015), Bekhet and bt Othman (2012), Campbell and Ammer (1993), Pastor and Veronesi (2012) and Rigobon and Sack (2003), even though some have presented ambiguous conclusions about whether government policies can affect stock markets significantly in the long term as well as in different countries or economies.

2.3.1 The impact of monetary policy on stock markets

Theoretically, there are two channels through which monetary policy can affect stock markets. The first channel is the adjustment of monetary supply or the interest rate, which can affect the liquidity of investors directly and influences stock markets by changing investment decisions. In the second channel, monetary policy can indirectly influence stock markets by impacting on the expectations of market participants or stakeholders. To some extent, monetary policy is easily misunderstood as a target tool for intervention in stock markets when share prices are fluctuating sharply (Chen et al., 2010). Many empirical studies have been conducted to investigate the impact of monetary policy on stock markets.

First, according to economic theory, by adjusting the interest rate or money supply, monetary policy can change market liquidity and significantly affect movements of stock markets. Most empirical studies present some evidence to support this proposition (Chatziantoniou et al., 2013; Chen et al., 2010; Hancock, 1989; Hsing, 2013; Sun & Ma, 2003).

Hancock (1989) tested the semi-strong form of the Efficient Market Hypothesis (EMH) with respect to anticipated and unanticipated monetary variables and finds a significant effect of monetary policy on the US stock market. In European stock markets, Chatziantoniou et al. (2013) highlight that monetary policy influences the stock markets significantly via either direct or indirect channels in the UK and Germany. Hsing (2013) finds the stock market index is negatively influenced by the money market rate in Poland. Similarly, studies focused on China's stock markets, such as Chen et al. (2010) and Sun and Ma (2003), provide evidence that monetary policy has a crucial impact on fluctuations of stock prices.

Secondly, apart from changing the current state of market liquidity, monetary policy can significantly influence the expectations of investors as well as the uncertainty in the market and further change the operation of stock markets. Bekaert et al. (2013) suggest that an easing stance of monetary policy helps reduce both risk aversion and uncertainty, with the former effect being stronger. In the international open-economy framework, Nave and Ruiz's (2015) results indicate that an expanding monetary policy in either the US or Eurozone, in the short term, can increase risk aversion of stock markets in the Eurozone.

In practice, it is easy to understand that a policy change can increase the volatility of stock prices and risk premium. In the study by Pastor and Veronesi (2012), laboratory simulations instead of empirical testing were used to identify the effects of government policy on the volatility of stock prices. The results suggest that, on average, government policy uncertainty has a positive impact on the decline of stock prices and changes in stock prices normally occur on the announcement of a policy change.

The literature also documents different findings of the impact of monetary policy on the movement of stock markets. Wright (1976) claims that the impact of adjustments in monetary policy on the stock market is relatively quick and direct, but it is difficult to identify the correlations precisely. It is also hard to identify exactly what the linkages are in which monetary policy directly influences the stock markets if the long-term effect is considered.

Darrat's (1988) study of Canada's stock market shows that past monetary actions have an insignificant effect on current stock returns. Campbell and Ammer's (1993) study shows no evidence to support the idea that real interest rates have any significant impact on future excess stock returns but the short-term nominal interest rate does impose a significant effect on future stock returns. Similarly, using data from 16 countries, a weak or nonexistent relationship between monetary policy and stock returns is claimed in the study by Durham (2003). The author's result confirms there is no correlation between monetary policy cycles and stock returns.

Theoretically, movements of stock markets can also impact on monetary policy because movements in stock prices are not only capable of influencing aggregate consumption through the wealth channel but also affect the financing costs of real businesses. To lessen the potential impact of stock market volatility on the macro economy, especially in emerging markets, the performance of the stock market can have an important influence on monetary policy decisions (Rigobon & Sack, 2003).

2.3.2 The impact of fiscal policy on stock markets

Compared with the empirical investigation of the effects of monetary policy on stock markets, very limited attention has been paid to the possible effects of fiscal policy on share prices. In the literature, the results of most studies support the view that there is very little influence of fiscal policy on stock markets. Hancock (1989) finds that fiscal deficits have an insignificant influence on stock prices in the US's and China's stock markets. The empirical results of Chen et al. (2010) identify that fiscal policy has an insignificant impact on the stock market. Similarly, the study by Hsing (2013) shows that the Polish government's deficit has an insignificant effect on movements of the stock market index. Jansen et al. (2008) point out that linear modelling often leads to the outcome of little significant influence of fiscal policy on asset markets because the nonlinearity problem is neglected. As claimed in their study, a fiscal deficit is likely to impose a significant impact on the stock market only if investors consider it a signal of constrained monetary policy actions.

Darrat (1988) uses Canadian data to explore the impact of fiscal policy on stock returns. The results show that there is a close relationship between fiscal policy and stock returns. Similarly, Bekhet and bt Othman (2012) indicate that the fiscal policy imposes a positive impact on the long term stock index movement or financial performance in Malaysia. Laopodis (2009) shows that past budget deficits negatively affect current stock returns, which suggests the stock market is inefficient with respect to information on future fiscal policy actions. The findings in one recent study also display a significant negative effect of fiscal policy on stock returns (Apergis, 2015).

However, by exploring the effects of the interaction between monetary and fiscal policies on stock market performance, Chatziantoniou et al. (2013) provide some positive results and highlight that macroeconomic policies, such as fiscal and monetary policy, can affect stock markets significantly by either direct or indirect channels. More importantly, some evidence supports the idea that the interaction of monetary and fiscal policy can influence the development of stock markets.

2.3.3 The impact of regulatory policy on stock markets

In addition to some fundamental rules and laws for monitoring stock markets, official regulators and stock exchanges apply four specific measures to control volatility: margins, price limits, circuit breakers, and transaction taxes. Theoretically, by comparison with margins and transaction taxes, which in practice do not induce trading halts, price limits and circuit breakers are likely to cause a market breakdown. All measures taken by regulatory

authorities involve tradeoffs in controlling volatility, affecting liquidity, and inducing price efficiency (Anshuman, 2003).

2.3.3.1 Margins

As defined in Ferris and Chance (1988), the margin requirement, which is a percentage of the market value of the securities, is the minimum amount of equity an investor must maintain in the account. It is introduced to regulate the extension of margin credit in financial markets (Ferris & Chance, 1988). The effectiveness of the margin requirement as a policy tool is the subject of numerous debates in financial markets.

To investigate the effect of margin requirements on stock market volatility, Ferris and Chance (1988) examined 19 margin changes in the US stock market mandated by Federal Reserve since 1945. The results provide very weak evidence to support the idea that there is a solid basis for regulators to introduce margin requirements to stabilize stock market volatility. According to the results reported by Ferris and Chance (1988), only in five of 19 changes were volatility changes in the opposite direction to the margin change. Similarly, Hsieh and Miller (1990) investigated both daily and monthly stock returns and initial margin requirements set by the Federal Reserve since October 1934. Their findings show also that there is no solid evidence to support the idea that the margin changes significantly affect fluctuations of the stock market, either in the short- or long-term.

Several other studies, such as Hardouvelis (1990); Hardouvelis and Theodossiou (2002), Hsu (1996), and Lee and Yoo (1993), argue that at least margin requirements do not worsen the volatility of stock markets; it is believed that the introduction of margin requirements helps lessen volatility and noise in the stock markets at the very beginning. In this sense, Hardouvelis (1990) claims that the policy tool of margin requirements helps stabilize the stock market volatility caused by speculative trading. Hardouvelis and Theodossiou (2002) point out that initial margin requirements help smooth fluctuations of stock markets in both normal and bullish times. However, there is no reliable relationship between margin requirements and the stock market volatility in bearish times.

In other markets, Lee and Yoo (1993) find that the margin effect on stock market volatility is dominated by the liquidity effect rather than the speculative effect but, among four different markets, only for Japan does the evidence suggest that a decrease in margin requirements could destabilize stock market volatility significantly in the short-term. Different from the other studies that mainly highlight the liquidity effect of margin trading, in Taiwan stock

market, Hsu (1996) finds no strong relationship between margin changes and stock volatility even though margin changes sometimes do cause a significant change in stock volatility.

Comparatively, to explore the effect of margin regulation on stock market volatility, Brumm et al. (2015) employed both theoretical models and laboratory simulations and their results show that there is no close relationship between changes in the margin regulation and volatility of stock markets; only countercyclical margins on all assets can significantly reduce fluctuations in stock markets. Despite positive evidence in a few studies, in general, the real effect of margin requirements on stabilizing stock market volatility is not exactly what the regulators expected.

2.3.3.2 Price limits

In practice, there are no price limits in most developed stock markets but, in the literature, there are still many studies focusing on the effect of price limits on stock markets and the results seem to be mixed. For example, according to Kim and Rhee (1997), no solid evidence supports the fact that price limits are effective in stabilizing the volatility of the stock market in Japan. However, in Thailand's stock market, Kim and Limpaphayom (2000) report that the system of price limits has distinct effects on different kinds of share. For instance, shares of small listed companies hit price limits more often than do stocks of the relatively big companies. In China's stock market, Chen et al. (2005) find that B-shares with a wider bid-ask spread, are more likely to hit price limits than A-shares.

In practice, strict price limits are more popular in emerging markets than in mature markets. According to Westerhoff (2003), price limits could be more conducive to reducing both volatility and deviation from fundamentals provided there are more investors in the stock market who prefer trend-extrapolating behaviour. The study by Berkman and Lee (2002) shows that wider price limits may increase long-term volatility and reduce overall trading volume and that there are larger adverse effects of widening price limits on smaller stocks.

2.3.3.3 Circuit breakers

In financial markets, psychological factors of investors are believed to significantly influence the volatility of share prices. As a result, it is also believed that investors' greed and fear are the natural destabilizing factors in financial markets under some special circumstances (Hu & Chi, 2013). Thus, in some extreme cases, regulators use a circuit breaker system to control market volatility by triggering trading halts. Unfortunately, there is limited evidence in the

literature that confirms the benefits of a circuit breaker system in stabilizing stock market volatility.

In earlier studies, Schwert (1990) claims that circuit breaker may cause less liquidity and lead to increased market volatility instead of stabilizing it. In contrast, Greenwald and Stein (1991) use general equilibrium models to analyze the potential effects of circuit breaker on stock market volatility. The results illustrate that circuit breaker might be helpful in stabilizing fluctuations in stock markets and thereby improve the market's ability to absorb a large volume of shocks if the circuit breaker is properly designed and implemented.

Lauterbach and Ben- Zion (1993) examined the behaviour of the small stock market in Israel that has a circuit breaker system and find no effect of trading halts on the long-run response of the stock market. Similar results are provided by Ackert et al. (1997) who focus on the stabilizing effect of the circuit breaker in the US stock market. Ex-ante effects of circuit breakers are explored in the study by Subrahmanyam (1994); the author's results show that the circuit breaker may result in more volatility of stock prices instead of curbing them because it is likely to promote share investors trading in advance and exacerbating price movements.

Based on the results of previous studies, very little evidence is found to support the idea that a circuit breaker system significantly helps reduce volatility or panic-driven selling. Moreover, a perverse effect reported by Subrahmanyam (2013) shows that circuit breakers can encourage magnet effects that may result in more intense fluctuations in stock markets.

2.3.3.4 Transaction taxes

For many regulators and economists, security transaction taxation is believed to be an ideal solution to limit speculative trading and to stabilise the volatility of the stock market. Conversely, most empirical results confirm that a transaction tax increases volatility rather than the expected decrease (Anshuman, 2003; Baltagi et al., 2006; Green et al., 2000). The study by Mannaro et al. (2008), which used extensive simulations, identifies that the tax actually increases volatility and decreases trading volumes.

In the Swedish stock market, the introduction of taxes was unable to control stock market volatility but tax changes can substantially affect stock price levels and turnover (Umlauf, 1993). Similarly, market volatility increases significantly after an increase in the tax rate in China's stock market; the change in the volatility shows that market performance becomes

less efficient in that the effects of the shocks can last for longer in the stock market (Baltagi et al., 2006).

Hu (1998) used 14 tax changes in the four economies of Hong Kong, Japan, Korea, and Taiwan during 1975–1994 and finds, on average, a higher tax rate can reduce the stock price but there is no significant influence on market volatility and turnover. By distinguishing different kinds of volatility, such as market volatility, fundamental volatility and excess volatility, Green et al. (2000) find changes in transaction costs have a significant, dependable effect on the volatility of stock prices, but in terms of the different concepts of volatility being measured, the signs of the effects are also different.

Based on the results in the related literature, it seems that imposing taxes on stock trading is not helpful in stabilising the stock market by discouraging destabilising trading activities. Thus levying a security transaction tax on stock trading is not an effective tool to regulate the stock market, at least not in China's stock market (Su & Zheng, 2011).

2.3.3.5 Laws, equity market liberalization and other policies

Generally, laws enacted to protect investors have a significant impact on stock markets because the liquidity of listed companies is easily affected by investors' protection. For example, in the Hong Kong equity market, the findings of Brockman and Chung (2003) confirm that more protective environments help lead to a narrower bid-ask spread because of the minimizing of information asymmetry among stock investors. Apart from the studies that focus on a single market, La Porta et al. (1998) investigated the influence of the legal system on financial markets among 49 countries. The results show that a sound law system can significantly contribute to stronger investor protection as well as effective corporate governance, which is helpful in developing the stock market.

Generally, it is believed that equity market liberalization leads to higher volatility in the stock markets of emerging countries. Bell and Quiggin (2006) report that it is not uncommon to see that financial market liberalization is a major cause of asset price volatility and, even worse, it could dramatically contribute to asset price bubbles in some extreme cases. Today, the Qualified Foreign Institutional Investors (QFII) system attracts more trading funds from overseas that are commonly used to develop the stock markets in some economies. Lin (2006) explored the QFII system in Taiwan and finds that investment by foreign investors increases gradually and plays an increasingly important role after some trade restrictions on foreign investors were gradually removed from Taiwan's stock market.

Government regulation is essential to maintain a healthy stock market because it is helpful to prevent the stock market from being influenced by shocks and imperfections caused by market failures. Unfortunately, excessive policy intervention and improper timing of policy implementation always fail to achieve the objectives of policy regulations or breach the inner operating mechanism and exacerbate the volatility of the stock markets (Chen et al., 2014; Shi, 2002). In China's stock market, the influence of government regulatory policies on the market is significant and the effect's duration is quite long. The study by Shi (2002) that concentrated on the effect of regulation policies on stock market volatility shows that the implementation of regulation policies increased the volatility of China's stock markets at twice the average normal level during 1992 to 2001.

Several studies, such as Brockman and Chung (2003), Baltagi et al. (2006) and Shi (2002), shed light on the influence of regulatory policies on China's stock markets because the rapid development of the economy and financial market is remarkably attractive to scholars. At the beginning, different from Russia and other former communist countries, a gradual, dual-track system was applied in reforming China's financial markets. Fast-track approaches have been adopted by other transition economies and they reveal that the dual-track approach works better than the fast-track approach (Allen et al., 2005). It is undeniable that the dual-track system in China's stock market inevitably results in some big issues for regulatory reforms such as a reduction of state-owned shares and full circulation of non-tradable shares. It is believed that the issues of state-owned shares and non-tradable shares left by the dual-track system account for some of the abnormal fluctuations in China's stock market in past decade (Zhang & Shi, 1998).

The effects of other reform policies on China's stock market have been explored in previous studies. For example, Lin and Swanson's (2008) study indicates that the introduction of price limits initially has a negative impact on stock investors as well as the enactment of security law in China. Conversely, the response of the domestic market is positive when foreign investors have access to invest in the A-share market. However, the results of Chen et al.'s (2008) study show that the opening of the A-share market to foreign investors has no measurable effect on stock return volatility, but opening the B-share market to domestic investors leads to a lower stock return volatility.

2.3.4 The impact of economic policy uncertainty on stock markets

The literature shows that economic environment uncertainty results from government policy and is commonly believed to be one of the major causes of fluctuations in stock markets.

Thorbecke (2001) conducted one of the earliest studies that focus on the relationship between policy uncertainty and the stock market; the author's results indicate that both greater monetary policy uncertainty and especially news about inflation account for asset price declines in 1994.

To measure economic policy uncertainty, Baker et al. (2013) develop an EPU index, which is built on three components[12]. Following this, some empirical studies began to test the effect of economic policy uncertainty on stock markets using the EPU index as a proxy variable. Some recent studies claim that the EPU index has a significant influence on stock markets (see Brogaard & Detzel, 2015; Chen et al., 2014; Donadelli et al., 2014, 2015; Liu et al., 2015).

In the US stock market, Apergis (2015) shows that the EPU index is positively correlated with the volatility of market returns. Similarly, Brogaard and Detzel (2015) point out that the EPU index is quantitatively related to changes in the excess stock returns in the US stock market[13]. The empirical results in Liu and Zhang (2015) indicate that the EPU index also exhibits significantly predictive power of stock market volatility.

By investigating the effects of US macroeconomic conditions on excess returns in 10 Asian stock markets, Donadelli and Persha (2014) illustrate that there is no causal link between the EPU index in the US and excess stock returns of Asian stock markets but the results of VAR (vector autoregression) analysis show bull Asian stock markets reduce US economic policy uncertainty (Donadelli, 2015; Donadelli & Persha, 2014).

Based on the log return of the Shanghai Composite Index and the US EPU index from January 1995 to December 2013, Chen et al. (2014) explore the dynamic relationship between stock market returns and economic policy uncertainty. Their results show there is remarkable negative correlation between the two series. There are also some other studies (such as Chen et al., 2017; Li, 2017) claiming that the EPU index is helpful to predict abnormal stock returns in China's markets.

Based on the studies discussed above, we conclude that economic policy uncertainty plays an important role in destabilizing the abnormal movements of stock returns and market volatility in both mature and emerging economies.

[12] The three components include the frequency of news media references to economic policy uncertainty, the number of federal tax code provisions set to expire, and the extent of forecaster disagreement over future inflation and government purchases (Baker et al., 2013, p. 1).

[13] The authors' study shows that an increase of one standard deviation in the EPU index is associated with a contemporaneous 1.31% decrease in market returns and a 1.53% increase in future three-month log excess returns (6.12% annualized) (Brogaard & Detzel, 2015, p. 3).

2.4 The impact of public information on stock markets

The theoretical foundation of the impact of public information on stock markets is known as the efficient-market hypothesis (EMH), which is undoubtedly attributed to the creative work of Professor Eugene Fama. According to Fama (1965, 1970), the EMH states that asset prices fully reflect all available information in terms of the three variants of the hypothesis: "weak", "semi-strong", and "strong" form. Based on Fama's work, most related studies focus on empirically investigating the impact of public information, such as firm-specific media coverage, economic news, important world events, market rumours and other public information such as analysts' reports, messages from the online stock message board and internet financial news on stock prices.

2.4.1 Firm-specific media coverage

The influence of firm-specific market news on the trading decisions and market expectations of investors can be reflected in changes of various market indicators such as stock price, trading volume and the number of deals. Mitchell and Mulherin (1994) suggest that the number of market announcements (or firm-specific news) is capable of affecting stock market activity directly. By identifying the effects of bad firm-specific news related to pollution, Hamilton (1995) finds stockholders experience negative abnormal returns on the first release of the information of Toxics Release Inventory (TRI) pollution figures. The reported effects are both economically and statistically significant. Using a comprehensive database of headlines about individual companies, Chan (2003) examined monthly share returns following public news; the results show that stock investors experience negative returns following the release of bad news.

News comments on stock markets in popular financial newspapers are likely to enforce a significant influence on the performance of stock prices. Tetlock (2007) quantitatively measured the interactions between the media and the stock market using daily content from a *Wall Street Journal* column; the results show that both stock prices and trading volumes are sensitive to news comments in newspapers[14]. Similarly, Fang and Peress (2009) claim that the range of information dissemination has a negative relationship with the stock returns[15]. According to Fang and Peress's (2009) results, it seems that 'no news is good news' also applies in stock markets.

[14] The author's results show that high media pessimism normally comes with downward pressure on market prices followed by a reversion to fundamentals, and a high market trading volume could result from unusually high or low pessimism (Tetlock, 2007, p. 1139).

[15] The findings suggest that stocks with no media coverage are likely to earn higher returns than stocks with high media coverage, even after controlling for well-known risk factors (Fang et al., 2009, p. 2023).

Generally, it is believed that favourable information about listed companies has a positive impact on stock prices whereas unfavourable news results in a decrease in stock returns. According to Solomon's (2012) results, more positive news raises investors' expectations of future profitability and leads to an increase in stock price in the short run, but investors can overreact to favourable information that may result in a lower return around earnings announcements in the longer run. In some cases, news information about listed firms may have distinctive effects on stockholders in different places since there is some evidence that media coverage affects the stock market regionally. For example, the study by Engelberg and Parsons (2011) shows that local media coverage strongly predicts local trading and local trading is also strongly related to the timing of local reporting.

For different market conditions and background, the effects of news announcements on stock prices are believed to be distinctive. According to Griffin et al.'s (2011) results, in most developed markets, news coverage has a significant impact on the firm's stock price on days with public news. In contrast, there is only a weak relationship between news announcements and the volatility of stock prices in many emerging markets so stock price volatility is similar on news and non-news days.

It is clear that news coverage has a significant effect on stock returns and trading volume in both developing and developed markets, and the effects of news information could differ among market participants. However, only some market participants are capable of gaining the access to some valuable information. In this circumstance, public news plays a key role in informing specific investors but not others because of asymmetric information, thus only investors with information advantage can trade on the information before it becomes public (Tetlock, 2010).

2.4.2 Economic news

Based on fundamental financial theory, economic news is commonly believed to exert a significant influence on financial assets. Some economic news related to money supply and interest rate has a more significant effect on stock returns than others (Pearce & Roley, 1985).

Practically, economic development is mainly reflected and affected by several major macroeconomic factors such as the money supply, inflation rate, retail sales, industrial production, and discount rate. As a result, economic news related to these indicators is likely to significantly affect the performance of the stock market. Chen et al. (1986) state that shocks caused by systematic economic news have a significant impact on stock returns. Using survey

data, Pearce and Roley (1985) investigated the daily response of stock prices to macroeconomic news. The results indicate that unexpected monetary policy significantly affects the volatility of stock prices. Comparatively, inflation surprises have a very limited effect on stock prices but no findings support news of real activity surprises having a significant impact on stock prices on the announcement days (Pearce & Roley, 1985). Using five macroeconomic variables, Jain (1988) examined the impact of economic news on hourly stock returns and trading volume; the empirical results indicate that stock price changes are significantly influenced by surprise announcements about money supply and CPI but there is no evidence that stock prices are significantly connected to the announcements about the other three variables. For trading volume, no effects of any of the five macroeconomic variable announcements are displayed, according to Jain's results.

Comparatively, in some other empirical studies, the results show that there is little impact of economic news on stock prices in the US market. For instance, the study by Schwert (1981) claims that announcements of unexpected inflation have only a weak negative impact on changes in stock prices. Cutler et al. (1989) attempt to measure the effects of news publication related to a macroeconomic time series from 1871 to 1986; the results show less than one-third of the monthly return variance can be explained from such announcements of changes in the macroeconomic variables.

Most studies assume that the responses of investors to news information remain unchanged over different stages of the business cycle. However, a rise in CPI in a booming economy could possibly result in more uncertainty than in a contracting economy. Boyd et al. (2005) highlight that the effects of economic news on the stock market may change over time in terms of different stages of the economic cycle. Some studies provide strong evidence to support this argument by investigating the responses of stock markets to economic news in different stages of the business cycle. For example, McQueen and Roley (1993) suggest that a stronger relationship between stock prices and economic news is evident in a specific stage of the business cycle. Boyd et al. (2005) find that, on average, an announcement of increasing unemployment is favourable news for stocks during economic expansion and unfavourable news during economic contraction. Similarly, information on interest rates has a significant impact on the stock market during economic expansion (Boyd et al., 2005).

2.4.3 Important events

Theoretically, the potential influence of an important event on the stock market is likely because investors are subject to several sources of uncertainty. First, the causes of the event

are always not very distinct when the news first reaches the market. Secondly, the news contains a certain degree of uncertainty and unreliability well before the event's details are explicitly confirmed by relevant authorities. Thirdly, even if the causes and possible results of the event are officially confirmed, the final impact of the event on the stock market is still determined through a set of complex indirect effects that still remain unknown on the day the news is first released (Barnea & Brenner, 1974). This inference is corroborated by most related empirical studies.

Based on several methods, most previous studies provide evidence supporting the view that important events are likely to produce a significant impact on the stock market. By exploring the headlines related to world events in *New York Times* and *Los Angeles Times*, a discernible influence of world events on stock market movements was identified by Niederhoffer (1971). Similarly, Barnea's (1974) study reports that news of important events has a systematic influence on changes in share trading volume. Using tick data, Fair (2002) identifies that important events can cause large stock price changes in the US stock market; most of the changes in stock price are closely related to adjustments in monetary policy.

Bittlingmayer (1998) used natural experiments to explore the link between political events and stock volatility in Germany; the results support the fact that unexpected political developments are the main causes of some large stock market movements. In addition to political events and other important world events, domestic natural disasters and social violence can also be influential in stock markets. Zhao et al. (2014) quantitatively compared the effects of natural disasters and social violence events on China's stock prices. The results indicate that both natural disasters and social violence events have significant negative impacts on the stock prices of listed companies where the events take place.

Although it is obvious that stock prices are likely to respond to important events, it is not easy to match particular events exactly to particular changes in stock prices (Fair, 2002). The difficulty in matching important events to abnormal stock price changes is supported by the work of Cutler et al. (1989). By selecting the 50 largest daily changes in the S&P 500 Index from 1946 to 1987, the authors attempt to find an exact explanation relating to particular events reported in the *New York Times* for every abnormal change in the stock index. Unfortunately, the authors' findings do not support the idea that an abnormal stock index change is exactly related to a particular event published in the newspaper. Fair's (2002) study also indicates that many large changes in stock price have no events associated with them.

2.4.4 Market rumours

By reaching a broad population of investors, market rumours have major, traceable effects on investors' buying and selling decisions that result in abnormal volatility in both stock prices and volumes (Pound & Zeckhauser, 1990). Some previous empirical and theoretical studies provide strong evidence to corroborate this proposition, e.g., Bommel (2003), Davies and Canes (1978), Zhao et al. (2010) and Zivney et al. (1996). According to the results of previous studies, market rumours have a pervasive impact on the changes in stock prices regardless of the information contained in the rumours. Rose (1951) developed an index to measure rumours named the "factors of stickiness" and examined the influence of rumours on stock prices in the US stock markets. The results illustrate that market rumours have a significant influence on the movements of stock prices. Similarly, Davies and Canes (1978) suggest that even secondary dissemination of analysts' recommendations is capable of affecting stock prices significantly.

Several studies shed light on the effects of takeover rumours on the movement of stock prices. Using a sample of rumours published in the *Wall Street Journal's* "Heard on the Street" column, Pound and Zeckhauser (1990) find that most takeover rumours account for unusual price and volume movements of the rumour-targeted shares. Like the study by Pound and Zeckhauser (1990), based on the analysis of 871 takeover rumours published in two columns of the *Wall Street Journal* between 1985 and 1988, Zivney et al. (1996) reveal that the market reacts differently to other reports on the same page of the journal[16].

Studies on other stock markets report more evidence on the effects of market rumours on share prices. Kiymaz (2001) assesses the influence of stock market rumours on the price changes in the shares traded on the Istanbul Stock Exchange. The results show market rumours can trigger an abnormal increase in the stock returns in each of the 4 days before the publication date and an insignificant decrease in abnormal returns is detected in the post-publication period. Zhao et al. (2010) investigated the impact of rumours on China's stock markets and find most rumours are bullish news, which leads to an abnormal shock to stock prices on the day of the rumour's publication and the previous trading day. Similarly, Bommel (2003) employs dynamic game models to illustrate that the early followers can profit from trading on rumours if rumours are informative and a rumour game can survive the moral hazard of cheating.

[16] According to the author's results, compared with rumours in the column of "Heard on the Street", trading on these overreactions caused by rumours in the column of "Abreast of the Market" would have resulted in annualized excess returns averaging 20 percent with 70 percent of the trades being profitable (Zivney et al., 1996, p. 89).

Market rumours can impose an important impact on stock prices and trading volumes in mature stock markets as well as in emerging stock markets because more uncertainty could appear and affect the expectation of market participants whenever market rumours spread out in the stock markets.

2.4.5 Other information

In the stock market, the celebrity status of some popular analysts affects investors' reactions to forecast revisions because these analysts' names are more familiar to stockholders. To identify the influence of analysts' reputation on investors' reaction to forecast revisions, Bonner et al. (2007) investigated the influence of analysts' celebrity on the investors' trading activities in terms of earnings forecast revisions; the findings support the idea that media coverage of financial market commentators is affected by the analyst's celebrity status. Bonner et al.'s (2007) results also demonstrate that the investors' reactions to forecast revisions is positively related to media coverage. Like popular analysts, financial journalists also can influence investors' behaviour, at least over short time horizons (Dougal et al., 2012).

Along with studies using newspaper articles and other kinds of news from publications, stock related information is now disseminated via the internet. As a result, online messages exert a more and more important influence on stock prices and volumes. Based on a huge sample of online messages, the results of Werner and Murray's (2004) study illustrate that messages posted on the popular columns of newspapers are helpful in predicting market volatility in the US stock market[17]. Similarly, Jin et al. (2013) explored the impact of online stock messages on the stock markets using nearly six million messages posted on China's largest stock message board. The authors' findings show that a higher bullish index predicts higher stock returns and diversified opinions contribute to a higher trading volume.

There are also some interdisciplinary investigations related to the impact of public information on stock markets. For example, using a support vector machine (SVM) derivative specially tailored for discrete numeric prediction and models containing different stock-specific variables, Schumaker and Chen (2009) show that the model containing both article terms and stock price at the time of article release has the best performance in closeness to the actual future stock price. The study by Jin et al. (2013) used text mining technology to extract online information relating to the stock market comments; the empirical results confirm that

[17] The author's study uses over 1.5 million messages posted on *Yahoo Finance* and *Raging Bull* on the 45 companies in the Dow Jones Industrial Average and the Dow Jones Internet Index (Werner, 2004, p. 1259).

market opinions posted on the online message board can predict changes in stock returns as well as trading volumes.

In summary, compared with the mixed results of previous studies that focused on exploring the effects of government policies on stock market volatility, it seems that public information, such as economic news, important events, and even market rumours, have more influence on movements of stock markets than the implementation of government policy.

2.5 Policy-driven stock markets in China

To the best of our knowledge, very few studies directly focus on the relationship between policy driving and the operation of China's stock markets from the perspective of risk management. Instead of using the term "policy risk", previous studies prefer to use "policy stock market" or "policy-driven stock market". This section summarizes the literature on the causes and negative effects of the policy-driven stock markets in China.

2.5.1 Definition of a policy-driven stock market

There are different definitions in the literature for a policy-driven market. In previous studies, excessive intervention and dramatic volatility are recognized as two key features of the policy-driven stock markets in China (Jiang & Xie, 2007; Liu, 2005; Zhang & Shi, 1998; Zhou, 1997). One explanation for too much intervention in China's stock market claims that regulators are inclined to control the market because of Leninist political habits[18] (Heilmann, 2002). Another study defines a policy-driven market as a phenomenon of market movement caused by government's regular policies (Chen, 2002).

In practice, there are two types of policy, one is to affect stock markets intentionally and the other is initially implemented to adjust the macro economy and exerts an influence on the stock market indirectly, which may influence movements of stock markets. Based on the different kinds of policy, Zhang and Shi (1998) explain a policy-driven stock market in both broad and narrow terms. In the broad perspective, a policy-driven stock market is a stock market that is often politically influenced by government. In the narrower perspective, it is believed that too much interference from regulators leads to severe fluctuations of and massive social costs in the stock market.

Thus, it is safe to say that the policy-driven stock market in China is the kind of market in which regulatory policy and government interference plays a more important role than the

[18] Leninist political habits mean the pervasive presence and elaborate hierarchy of Party organs in state, military, economic and social organizations.

dynamics of market competition in determining the movements of stock prices. Further, the most powerful market participants and insiders with information advantages can benefit from the market control.

2.5.2 Causes of policy-driven stock market

Most relevant studies, such as Han and Tang (2002), Xiao (2003) and Yu (1998), tried to explain the causes of policy-driven stock markets in China, and identify institutional deficiencies, government's multiple roles in the stock market, conflicting policy objectives, and discretionary regulations and policies, as well as the systematic deviations of governmental decision-making as the major causes of the policy-driven market.

First, since its initiation, the regulation of China's stock market was oriented towards supporting state-owned enterprises, stabilizing the market operation, and potentially providing an implicit guarantee for different kinds of investors. Thus, it is not uncommon to see a high degree of intervention led by the government is used to achieve multiple objectives (Han & Tang, 2002; Heilmann, 2002; Yu, 1998).

Secondly, as an emerging stock market, a sound market regulatory system has not been fully established in China, so it is natural for regulators to directly intervene in the market when market failure occurs (Wang, 2002). Moreover, as simultaneously a participant and a regulator, the conflicting roles of government make the "policy effect" a key factor affecting fluctuations of the stock market (Qiao & Zhan, 2002).

Thirdly, in China's stock market, investors are familiar with intervention by regulatory authorities in the past decades, especially in bad times. As a result, regulators' multifunctions always worsen the situation when the market is going down because the anti-driving mechanism of market participants forces the government to influence on share prices (Qiao & Zhan, 2002).

The policy-driven market is deeply rooted in the administrative ways, which has been described as 'wade across the stream by feeling the way', used by regulatory authorities to stabilise the stock market (Wang & Ye, 2011). Therefore, discretionary policy operation always misleads the expectations of market participants and causes sharp movements in stock prices; the inappropriate choice of policy timing brings more uncertainty to the stock market (Xiao, 2003; Yu, 1998).

In few cases, political concerns might be the reason for stock market control because some listed firms were selected in terms of political criteria rather than market demand (Heilmann, 2002; Xiang & Wang, 2004). Thus, the establishment and development of China's stock market and share trading are always subject to intensive ideological and political controversy (Heilmann, 2002).

2.5.3 The effects of policy-driving on stock markets

In practice, China's regulators try to adjust the movements of the stock market and intend to keep an unhurried, continuous and healthy bullish market. Unfortunately, the measures taken by the authorities always result in unpredictable sharp volatility of stock prices instead of stability.

In previous studies by domestic researchers, such as Lv and Zhao (2000), Peng and Xiao (2002), and Shi (2002), the relationship between market intervention led by the government and fluctuations in China's stock market has been explored based on theoretical analysis and also empirical testing. Most findings confirm that the abnormal movements of stock prices are significantly caused by policy-related uncertainty in the stock market.

Peng and Xiao (2002) investigated the relationship between government intervention and changes in stock prices and indicate that regulatory agencies' interference impose a significant impact on market fluctuations in the Shanghai Securities Market. By investigating whether any important policy events took place in the 10 trading days before and after abnormal fluctuations of the stock index, Lv and Zhao (2000) illustrate that policy-driving is one of the main features of China's stock market. Similarly, Shi (2002) finds that, on average, newly introduced policy doubles movements of the stock market and the large volatility may last for a quite long time.

It is believed that discrete regulatory activities could more likely result in abnormal movements of the stock market than regular government policies or regulations. Xu and Li (2001) explored the influence of policy on the capital market by dividing policy-related events into long-term continuous and short-term discrete events and reveal positive correlations between continuous policy events and movement of China's stock markets. Compared with long-term policy events, short-term policy events have a deeper impact on the stock market. Similarly, Hu (2003) analysed the relationship between abnormal fluctuations of the Shanghai Composite Index and major policy-related events. The results support the view that there are economically significant effects of discrete policies on the volatility of China's stock market.

In different stages of stock market cycles, the same stance of government policy may have different effects on movements of stock prices. Wang et al. (2012) categorized the policy factors and quantified them in terms of their effects on Chinese stock markets. Their empirical results suggest that policy factors significantly affect stock market volatility, both upwards and downwards. Furthermore, in a bull market, policy factors are more likely to trigger big stock movements than in a bear market (Wang et al., 2012).

Apart from affecting overall stock prices, regulatory intervention may impose a negative influence on specific stock investors in China. Qu et al. (2008) highlight that government intervention also reduces the level of the compensation ratio in equilibrium and thus expropriates the interest of tradable shareholders. Furthermore, as the level of government intervention rises, the compensation ratio of state-owned firms declines. Therefore, it is safe to say that share investors in China have to face some unpredictable policy risks that are deeply rooted in the initial dual-track system in China's stock market.

In previous studies, such as Han and Tang (2002), Lv and Zhao (2000) and Shi (2002), the policies and regulations result in overreaction by investors because the changes are implemented by the government unexpectedly. Practically, some regulatory rules rather than direct intervention play a crucial role in stabilizing the stock market in special cases. Therefore, in most countries, financial markets benefit from the government's regulatory policies; we have to admit that a well-run system in a mature market might lead to disaster in another country. For example, according to Lv's (2000) results, one regulatory policy known as price limits did not induce any liquidity risk for investors in China's stock market. Conversely, the circuit breaker introduced in early 2016 caused great panic and liquidity risk in China's stock market while regulatory authorities tried to halt trading to stabilize undesirable fluctuations of the stock market[19].

According to the explanations in the literature, some suggestions have been presented to improve the efficiency of the government's regulatory policies and keep the stock market free of severe fluctuations. Among these suggestions, it is commonly believed that strengthening the government role as a stock market guardian is most important to stabilize stock market volatility (Han & Tang, 2002; Hu, 2003; Lv & Zhao, 2000). Further, a sound regulatory system and market-oriented supervisory style are also necessary and crucial to lessen the

[19] The rule of a circuit breaker system is commonly used by major stock markets around the world to offer investors a chance to calm down and stabilize the volatility of shares prices; however, it shut down China's main stock markets twice in the first trading week in January 2016; stock trading lasted for only 15 minutes after shares plunged by 7% on January 7, 2016.

policy-driven effects on the volatility of share prices in China's stock market (Wang & Ye, 2011; Xiao, 2003; Xu & Li, 2001).

2.6 A brief summary

The impacts of different government policies on stock markets are summarized in Table 2.1, and detailed summaries are presented in Appendix A. According to the discussion in Section 2.4, the impacts of different public information on stock markets are summarized in Table 2.2.

Based on the information provided in Tables 2.1 and 2.2, the effect of public information, including policy-related news, on stock markets could possibly be more significant than that of government policy announcements.

Table 2.1 The Impact of Government Policy on Stock Markets

Policy Category		Developed Markets	Developing Markets	Long-term	Short-term
Monetary Policy		Mixed	Yes	Mixed	Yes
Fiscal Policy		No	Mixed	No	Mixed
Regulatory Policies or Laws	Margin	Mixed	-	No	Mixed
	Price Limit	No	Mixed	-	-
	Circuit Breaker	No	-	No	No
	Transaction Tax	Yes	Yes	No	Yes
	Laws and other	Yes	Yes	Mixed	Yes
Economic Policy Uncertainty		Yes	Yes	Yes	Yes

Notes: '-' means no studies available to the time this summary was completed; 'Mixed' means the results are inconsistent; 'Yes' means the effect is significant and 'No' means no effect or only a weak effect is found.
Source: Author's summaries from the literature.

Table 2.2 The Impact of Public Information on Stock Markets

Public Information	Developed Markets	Developing Markets	Stock Price	Trading Volume
Firm-specific Media Coverage	Yes	Yes	Yes	Yes
Economic News	Mixed	Mixed	Mixed	Mixed
Important Events	Yes	Yes	Yes	Yes
Market Rumours	Yes	Yes	Yes	Yes
Other Information	Yes	Yes	Yes	Yes

Notes: 'Mixed' means the results are inconsistent and 'Yes' means a significant effect is found.

Source: Author's summaries from the literature.

2.7 Conclusion

There is a growing literature that focuses on exploring the relationship between government policy and the stock market. Among these studies, such as Apergis (2015), Brumm et al. (2015) and Nave and Ruiz (2015), there are some inspiring insights that help enhance our understanding of the causes of stock market volatility. The features, causes and effects of policy-driven stock markets have been extensively explored in China based on both theoretical and empirical methods (e.g., Qu et al., 2008; Wang and Ye, 2011; and Wang et al., 2012). The results are believed to have strong explanatory ability on the phenomenon of the sharp volatility in China's stock market; the policy implications in these studies offer meaningful implications to policy makers.

According to the results of the previous studies, the impacts of government policies on China's stock market are significant based on the event study method. However, clarifying whether the risk or uncertainty caused by government policies has a dynamic effect on China's stock market still has some outstanding issues that need to be further explored.

First, it is important to quantify policy risk to identify the effect of policy-related risk or uncertainty on stock market volatility though no such variables are available for empirical investigation. To find a suitable proxy to measure policy risk is a big challenge for researchers. Undoubtedly, the EPU index of Baker et al. (2016) is very helpful in offering a good proxy for economic policy uncertainty and scholars can use the EPU index to conduct studies related to the effects of policy uncertainty across the world.

Unfortunately, the EPU index for China is problematic because the index is developed based on newspaper articles and keyword counting, which can be based only on the reports in the *South China Morning Post* (SCMP), an English-language newspaper published in Hong Kong. Most investors in Mainland China prefer to keep track of the official news and authorities' statements about the stock market rather than obtain information from an English newspaper because they believe that understanding the special language system in China's official media is extremely conducive to successful investment decisions[20].

Secondly, mainstream studies on stock market volatility in China are mainly conducted by exploring the effects of conventional government policy such as monetary policy, fiscal policy, and regulatory policy. In practice, official comments, announcements, and talks about

[20] It is not uncommon to see stock investors in China depending heavily on obtained policy-related information to make their investment decisions and policy-related information is also most frequently used by professional analysts to explain the big movements of stock prices.

the stock market might also have a significant impact on investors' expectations and further impose a great influence on the operation of the stock market. It is critical to take these factors into account when investigating the causes of the frequent movements in China's stock markets.

Thirdly, previous studies have produced different results to explain the causes of stock market volatility. To a large extent, choices of sampling time spans are considered one of the main reasons for those inconsistent results followed by differences in methodology. China's stock market changes frequently from time to time and some subtle alterations in regulatory approach will result in remarkable changes in market expectations. For a better understanding of the policy effect on China's stock market, it is reasonable and crucial to have the sample period cover the latest stock market cycle that started in early 2014.

Most importantly, by developing a new index to measure policy risk in China's stock market, this study attempts to provide a valuable perspective from which we can get a better understanding of China's policy-driven stock market and learn some policy implications about how to regulate the biggest emerging stock market effectively and efficiently in terms of risk management.

Chapter 3

The Impact of Policy Events on China's Stock Market

3.1 Introduction

Based on both theoretical and empirical analysis, this chapter explores the effects of policy events on fluctuations in the stock market to ascertain whether most policy events can be treated equally in developing a proxy index to measure policy risk in China's stock markets. Six categories of policy event are identified in Section 3.2 according to their different influences on stock markets. Section 3.3 discusses the influencing mechanisms of the different kinds of policy event. In Section 3.4, the effects of monetary policy on stock market volatility are identified by exploring the differences between the implied and actual movements of the stock index on selected trading days based on interest rate or reserve ratio adjustments. Based on daily market review articles in the *China Securities Journal*, Section 3.5 investigates the causes of historical abnormal volatility in China's stock market. The last section summarizes the chapter.

3.2 Classification of stock market-related policy events

A variety of government policies and policy-related events can influence the operation of China's stock market. In terms of different policy objectives, all the stock market-related regulatory policies can be broadly categorized into two classes. One class focuses on creating a fair and transparent environment for all market participants and the other aims at maintaining a desirable overall level of securities' prices, which is believed to be conducive to maintain a stable, healthy development of the stock market.

In practice, regardless of the type of target the regulatory policy aims at, from the perspective of stock investors, there are six major types of policy event in stock markets that are likely to give rise to market uncertainty or investment risk. These policy events can be summarized as: regulations and laws; system reformation; regulatory activities; administrative intervention; official comments; and adjustments of economic policies.

3.2.1 Regulations and laws

Regulations and laws concerning stock markets are the fundamental rules and principles for investors as well as listed companies to abide by when participating in the market that are formulated to create and maintain a fair and transparent market for all market participants.

The regulations and laws in China's security markets have been gradually released and enforced step by step since it is still a developing capital market with a history of fewer than 30 years. For example, the fundamental legal document the "*Securities Law of The People's Republic of China*" was implemented in December 1998 but its enforcement started around eight years later than the foundation of the Shanghai Stock Exchange (SSE, founded in and operated from December 1990).

3.2.2 System reformation

System reformation concerning the stock market includes the introduction of new trading rules, changes in current regulations and regulatory authorities (He, 2009). It is not uncommon to see reform of the regulatory system conducted from time to time in China's stock market. In practice, there are some major issues, such as state-owned shares and no-tradable shares in the history of the stock market's development in China because the initial objective of the foundation of the capital market mainly focused on providing low-cost financing for state-owned enterprises rather than improving the efficiency of the financial market (Wang et al., 2012). For instance, in the beginning, state-owned shares were untradeable to ensure control of state-owned enterprises by the central government; this rule goes against the requirements for operating listed companies in terms of the structure of modern corporate governance and, as a result, reform occurred in June 2001 to enable state-owned shares to be tradable (He, 2009).

3.2.3 Regulatory activities

To safeguard the efficient, transparent operation of the stock market, three main kinds of regulatory measures (economic, legal and administrative) under special circumstances, were explored by authorities to supervise the behaviour of investors and investment intermediaries as well as the offering and trading of securities (Wang et al., 2012). In China, stock market violations, such as market manipulation, false information disclosure, customer fraud and insider trading, are still quite common thus the regulatory actions need to be taken frequently to maintain a healthy, orderly market environment. As a result, apart from daily regulation, some special actions are taken by regulatory officials to deal with such potential problems that could be seriously detrimental to the stable development of the stock market. For example, the '*Special enforcement action of CSRC in 2015*' engaged in by regulatory authorities mainly

concentrated on fighting against stock market violations related to insider trading, market manipulation and financial fraud for IPOs[21].

3.2.4 Administrative intervention

In developed stock markets, it is unusual to find any direct interference by the government in stock market affairs but, in China, under some special circumstances, there is an increasing tendency that the regulatory authorities prefer to stabilize volatile fluctuations of the stock market by virtue of active administrative intervention instead of other market-oriented measures (Wang et al., 2012). Consequently, it gradually became a main reason that the Chinese government has been criticized for making a policy-driven stock market. In practice, official market intervention in China's stock market is believed to more likely trigger big market volatility rather than stabilizing it. In June-July 2015, Chinese regulators limited short selling under a threat of arrest and encouraged state-owned brokers to buy shares by providing liquidity to stabilize the turbulent stock market; the regulatory authorities asked the major securities companies to stop selling stock when the Shanghai Composite Index (SHCI) was below 4500[22].

3.2.5 Official comments

Despite the fact that there is no formal requirement for authorities to perform regulatory duties, official comments often play a very important role in regulating China's stock market. There are several ways by which regulators make comments about the current situation or future developments of the stock market, such as officials' public speeches, media interviews, review articles on the stock market and official statements. Under the special political atmosphere formed a long time ago, official comments from the People's Republic of China have a remarkably significant influence on market participants because stock investors in China are inclined to believe that official comments are very influential in the operation of the stock market (Zhu & Xie, 2011; Wang et al., 2012); some abnormal movements in stock prices are always preceded by the latest published official comments. For example, one comment on the *People's Daily* website was believed to trigger massive amounts of investment by individual investors in stocks in April 2015[23].

[21] **Source:** The official website of CSRC: http://www.csrc.gov.cn, 2015-04-24.
[22] **Source:** No selling when the SHCI is below 4500, *Beijing Morning,* 2015-07-05. http://www.morningpost.com.cn/2015/0705/794888.shtml .
[23] On April 21, 2015, one article on the *People's Daily* website made a comment that '4000 of Shanghai Composite Index is only a starting point of the current bull market', which triggered unprecedented enthusiasm of stock investors and further inflated the stock market bubble.

3.2.6 Adjustment of economic policy

Another category of policy events concerned investors is the adjustment of economic policy including macroeconomic policy, regional development policy as well as industrial policy. Economic policies are aimed at developing the economy rather than promoting the development of the stock markets; but, in practice, news information about changes in economic policy is likely to attract enormous attention of market participants because macroeconomic conditions significantly affect the profitability of listed companies as well as the investment expectations of stock investors. In the past decade, in only a very few cases has the central government of China tried to stabilize the stock market by monetary policy operations, e.g., the recent stock market bailout in the form of an unlimited liquidity injection by the Central Bank of China in June-July 2015[24].

Table 3.1 Categories of GovernmentPolicy Actions Related to the Stock Market

Categories	Description	Example
1. Regulations and Laws	The fundamental rules and principles for investors as well as listed companies to follow in the capital market.	'Securities Law of The PRC'
2. System Reformation	The introduction of new trading rules, changes in current regulations and regulatory authorities.	Reduction of state-owned shares.
3. Regulatory Activities	Regular supervision of the behaviour or conduct of investors and investment intermediaries as well as the offering and trading of securities.	IPO verification; investigation of insider trading by CSRC.
4. Administrative Intervention	Interference by government to stabilise the stock market under some special circumstances.	The bailout of the stock markets in July 2015.
5. Official Comments	Comments on the current situation or the future development of the stock market, mainly from officials' public speeches, media interviews, review articles about the stock market and official statements.	Published interviews of CSRC's president in *Securities Times.*
6. Adjustment of Economic Policy	Changes in economic policies including macroeconomic policy, regional development policy and industrial policy.	Interest rate changes; national economic development strategy of 'one band one road'.

Source: Author's summary based on the literature.

Apart from the six types of policy event shown in Table 3.1, some other stock market-related events are also likely to induce uncertainty and result in market volatility, e.g., the appointment of the president of CSRC and the establishment of the Small and Medium-size Enterprise Board by the Shenzhen Stock Exchange. However, in this present study, it is

[24] According to the reports in *China Business News* on 07/09/2015, in June-July 2015, apart from the cutting the interest rate and reserve ratio, the central bank of China also provided liquidity for CSFC (China Securities Finance Corporation, a state-owned securities company) to buy shares in the stock markets. It was severely criticized by some stock market analysts and commentators because shares buying by CSFC with money from the central government is considered absolutely inappropriate under any circumstances.

unnecessary to develop a new category because the influence of this kind of event on investors is like the influence from the release of fundamental regulations and laws.

In addition to the policy events summarized above, there are other important events related to stock market volatility, such as political issues, natural disasters and the global financial crisis. This study focuses on investigating the effect of policy risk on the volatility of the Chinese domestic stock market, thus any events unrelated to the domestic regulatory policies (or activities), such as interest rate adjustments in the US and Britain exiting from the EU (Brexit), are not included in the classification in Table 3.1, even though they do have a significant influence on stock market volatility.

3.3 The influencing mechanisms of stock market-related policy events

Theoretically, there are four main channels through which policy events impact on movements of stock prices. These four channels include adjustments to stock supply and demand, improvements in the market environment, expectation guidance and direct trading intervention.

3.3.1 Adjustments to stock supply and demand

In financial markets across the world, one commonly used measure to regulate stock markets is adjustments to stock supply or demand. For example, in China, regulatory authorities are likely to encourage more investment in share buying by reducing transaction costs and, conversely, more IPOs can cool down a heated stock market by increasing the amount of the stock supply. Generally, it is believed that adjustments to stock supply and demand help to maintain a stable, healthy development of the stock market without any direct government interference (Han & Tang, 2002; Lv & Zhao, 2000; Shi, 2002; Wang et al., 2012).

3.3.2 Improvements in the market environment

A favourable market environment is crucial for investors to invest in the stock market; conversely, a worsening market environment raises the concerns of market participants and impedes the healthy development of the stock market. For this reason, one main duty of the regulatory department is to perform routine market supervision and continuously fight against market violations such as insider trading, customer fraud, false information disclosure and market manipulation. A healthy market environment enables investors to have not only fair and transparent rules to follow but also stable expectations for future investments. In a favourable market environment, improvement in information availability helps to reduce

investors' transaction costs as well as market uncertainty, and smooth the fluctuations of the stock market.

3.3.3 Expectation guidance

In addition to conducting regulatory supervision, 'open mouth operation'[25] is frequently used by regulators to influence investors' expectations in China's stock market. Therefore, it is not uncommon to see officials from central government attempt to affect market expectations by making public speeches or announcements on the policy attitude of the government that are closely associated with the development of the stock market (Lv & Zhao, 2000). Some articles or news containing official comments relating to the stock market are also available to investors in major state-owned newspapers such as *People's Daily*, *Guangming Daily*, *China Securities Journal* and *Securities Times*, as well as on *CCTV* (China Central Television) news[26].

For market participants in China's stock markets, information that is obtained from government announcements or official comments is one of the main determinants of investors' investment decisions (Song & Wu, 2010; Wang et al., 2012). According to the empirical results of Li and Min's (2015) study, government information communication has a significant influence on the expectations of stock investors. Thus, leading market expectations proved to be a very useful way for regulators to influence the operation of the stock market (Hu, 2003; Li & Min, 2015).

3.3.4 Trading intervention

Another influencing mechanism of policy events is direct trading intervention conducted by regulatory authorities, such as prohibiting investors from short-selling and encouraging state-owned financial companies to buy shares (Zeng et al., 2016). In extreme cases, it could be the most effective way for a government to bring crashing stock markets under control in the short term. However, it is believed that the regulator's violation of market trading rules has a significant negative impact on the government's credibility as well as the development of the stock market[27], not to mention that the effect of direct trading intervention in the long term

[25] It refers to a kind of approach explored by the central banks to adjust overnight interest rates in developed countries such as the US, Canada, New Zealand and Australia; compared with open market operation by treasury trading; open mouth operation is performed to adjust overnight interest rates only by official announcement of a favourable level of market interest rates without any extra policy costs involved.

[26] In 2015, an index of CNSI (CCTV News Sentiment Index) was developed by one stock analyst in China Merchants Securities to predict the daily movement of the stock index. The details of the index are available on: http://money.163.com/15/0511/15/.

[27] Ren, Z. H. Government intervention: a similar cycle, *Asia-Pacific Economic Times*, 17/06/2015.

remains unknown[28]. Consequently, being the market guardian, direct trading intervention by the government produces harsh criticism from market commentators and investors.

The influencing mechanisms of the different categories of policy event are summarized in Table 3.2.

Table 3.2 Influencing Mechanisms of the Different Categories of Policy Event

	Categories	Influencing Mechanisms
1	Regulations and Laws	Improvement of market environment
2	System Reformation	Adjustments of stock supply and demand Improvement of market environment
3	Regulatory Activities	Adjustments of stock supply and demand Improvement of market environment
4	Administrative Intervention	Adjustments of stock supply and demand Trading intervention
5	Official Comments	Expectation guidance
6	Adjustment of Economic Policy	Adjustments of stock supply and demand Expectation guidance

Source: Author's summaries based on the above discussion.

According to the summary in Table 3.2, there are six major categories of policy events related to China's stock market. They are likely to affect the volatility of share prices potentially through the four different channels discussed above.

However, some policy events could easily lead to a significant change in market participants' expectations whereas other policy events have nothing to do with uncertainty in the stock markets. Thus, we need to identify if all policy events, such as the changes in monetary policy, should be treated equally in developing the proxy index to measure policy risk in China's stock markets.

3.4 Does it matter about monetary policy implementation?

According to Chen et al. (2010), Nave and Ruiz (2015), Pastor and Veronesi (2012) and Sun and Ma (2003), there is no consensus on the proposition that monetary policy has a significant influence on the volatility of stock markets. For example, Chen et al. (2010) claim that monetary policy has a significant impact on the stock market in China but Sun and Ma (2003) suggest that monetary policy implementation, such as adjustments of interest rates, has an insignificant impact on stock prices in China's stock market.

[28] Xiao, G. Y. An abnormal stock market resulted from frequent government intervention, *Securities Times,* 18/05/2010.

With regard to policy-related news articles used in developing the PRI in this study, it is essential to identify whether the implementation of monetary policy can affect the volatility of China's stock market. Thus, based on the daily movements of the SHCI before and after adjustments of interest rates and the deposit-reserve ratio of commercial banks, the relationship between monetary policy implementation and stock market volatility needs to be further explored between 1990 and 2016 in China[29].

3.4.1 Influence of interest rate adjustments on the stock markets

According to economic theory, the interest rate level has a negative relationship with the performance of the stock market. On the one hand, a higher deposit interest rate is likely to encourage investors to transfer money from the stock market to commercial banks for higher risk-free profits[30]; on the other hand, a higher interest rate may negatively influence listed companies from incurring greater financing costs and so worsen profitability. Therefore, an increase (decrease) in official benchmark interest rate could cause a decline (increase) in the stock market index.

Based on actual daily movements with the theoretically implied movements of the SHCI on particular trading days that are close to the publication dates of interest rate adjustments, the influence of interest rate adjustments on stock market performance can be identified. To determine the real effect of the interest rate adjustments, an indicator of the match rate, which reflects the consistency of the direction of the actual and implied index movements of the SHCI, is defined and calculated by dividing the total sample days into the number of days on which the actual and implied index movements are in the same direction.

3.4.1.1 Method description

First, interest rate adjustments from 1990 to 2015 are collected and two important dates are recorded as PD_t (Publication Date of interest rate adjustment) and ED_t (Effective Date of interest rate adjustment). The day before PD_t is PD_{t-1} [31] and the day after PD_t is PD_{t+1} [32]. Second, based on the above classification, the theoretical values of daily stock index returns

[29] Compared with other types of monetary policy operation, adjustments of interest rates and reserve ratios are more influential on the financial market in China. Thus, our analysis does not include the two monetary policy instruments, i.e., open market operation and discount rate adjustment.

[30] Theoretically, the deposit rate is not equal to the risk-free rate. But in China, commercial banks are endorsed by central government and thus it is not uncommon that the deposit interest rates are practically treated as risk-free rate. Some articles, such as Tan et al. (2008) and Ren et al. (2012), also use bank deposit rate to represent risk-free rate.

[31] Considering that news of official adjustment of interest rates might leak out, the day before the publication date is also included in the analysis.

[32] The day after PD_t is assumed to be the same day as ED_t.

are coded as '+' when the official interest rates are to be reduced and '-' when there is an increase in the interest rate by the Central Bank of China. Third, the corresponding real values of daily stock index returns for PD_{t-1}, PD_t and ED_t / PD_{t+1} are collected and coded by '+' and '-', respectively, in terms of different changes in the stock index. Nothing is recorded if PD_t is not a trading day and the value of the closest next trading day is recorded if ED_t / PD_{t+1} is not a trading day. Similarly, the value of the closest last trading day is recorded if PD_{t-1} is not a trading day. Next, the match rate of the real and theoretical value is computed for all of the selected dates as PD_{t-1}, PD_t and ED_t / PD_{t+1}. According to the size of calculated values of the match rate, different influencing levels of interest rate adjustment on stock market changes are defined (see Table 3.3).

Table 3.3 Definition of the Interest Rate Influencing Levels

Influencing Level	Match Rate	Definition
Level A	$mr = 1$	Completely negatively correlated
Level B	$0.75 \le mr < 1$	Strongly negatively correlated
Level C	$0.6 \le mr < 0.75$	Weakly negatively correlated
Level D	$0.4 < mr < 0.6$	**Uncorrelated**
Level E	$0.25 < mr \le 0.4$	Weakly positively correlated
Level F	$0 < mr \le 0.25$	Strongly positively correlated
Level G	$mr = 0$	Completely positively correlated

Finally, the result of the relationship between interest rate adjustment and stock market movement is given based on the definitions in Table 3.3.

3.4.1.2 Results and implications

There were 38 interest rate adjustments in China between April 1990 and December 2015. Detailed information on the interest rate adjustments is shown in Appendix Table B.1. The data of actual movements and theoretical changes in the SHCI are shown in Appendix C.1. According to the calculated results shown in Table 3.4, the match rate of PD_t is only 0.43 whereas it is 0.5 and 0.42 for PD_{t-1} and ED_t / PD_{t+1}, respectively.

Although the definition of interest rate influencing levels in Table 3.3 is somewhat subjective, the match rate results support the idea that adjustment of interest rates has an insignificant impact on movements of the stock market index in China. The results also imply that, in

practice, the stock market is unlikely to be significantly affected by announcements of monetary policy implementation.

Table 3.4 The Match Rate Results for Interest Rate Adjustments in China

Date	Total Observations	Matched Observations	Match Rate	Results
PD_{t-1}	38	19	0.50	Level D
PD_t	28[33]	12	0.43	Level D
ED_t / PD_{t+1}	38	16	0.42	Level D
Overall	104	47	0.45	Level D

Source: Author's calculations based on the Wind database.

3.4.2 Influence of deposit-reserve ratio adjustment on the stock markets

Theoretically, the deposit-reserve ratio level has a negative relationship with the performance of the stock market. A higher ratio of commercial banks' reserves means less liquidity available in financial markets. Further, an increase in the reserve ratio clearly releases a signal of a tightening monetary policy and, generally, it is unfavourable news for stock investors. Therefore, an increase (decrease) in deposit-reserve ratio can possibly result in a decrease (increase) in the stock market index (Sun & Ma, 2003).

3.4.2.1 Method description

Like the method discussed in Section 3.4.1, first, the dates of reserve ratio adjustments between 2003 and 2016 are collected and two important dates are recorded as PD_t (Publication Date of the reserve ratio adjustment) and ED_t (Effective Date of the reserve ratio adjustment). The day before PD_t is PD_{t-1} and the day after PD_t is PD_{t+1}. Different from adjustments of interest rate, the day after PD_t is not the same day as ED_t for reserve ratio adjustments. Based on the same approach discussed in Section 3.4.1.1, the match rates of actual and implied value are computed for all the PD_{t-1}, PD_t PD_{t+1} and ED_t dates. For the influencing levels of reserve ratio adjustments on stock market performance, the definitions presented in Table 3.3 are then applied in the next step of the analysis.

3.4.2.2 Results and implications

[33] No dates are counted if PD_t is not a trading day. There are only 28 observations in Table 3.4 because 10 of the 38 publication dates are not trading days.

There were 45 reserve ratio adjustments in China between August 2003 and March 2016. Detailed information on the reserve ratio adjustments in China are shown in Appendix Table B.2. The information on actual movements and theoretical changes in the SHCI is shown in Appendix C.2. According to the calculated results shown in Table 3.5, the match rates of PD_t, PD_{t-1}, PD_{t+1} and ED_t are 0.51, 0.35, 0.47 and 0.43, respectively.

The match rate of PD_t with a value of 0.35 suggests that even on the publication day there is only a weak, positive relationship between the movements of the stock market index and adjustments to the deposit-reserve ratio in China; that result is opposite to the theoretical expectation since a positive relationship means an increase in the reserve ratio could possibly cause a rise in the stock market index.

Table 3.5 Results of Match Rate Calculation

Date	Total Observations	Matched Observations	Match Rate	Results
PD_{t-1}	45	23	0.51	Level D
PD_t	31	11	0.35	**Level E**
PD_{t+1}	45	21	0.47	Level D
ED_t	40	17	0.43	Level D
Overall	161	72	0.45	Level D

Source: Author's calculations based on the Wind database.

Based on the results shown in Tables 3.4 and 3.5, it is safe to say that, in practice, there is no solid evidence to support the view that the implementation of monetary policy has a significant impact on the performance of China's stock market. This implies that released monetary policy implementations could barely cause any risk or uncertainty in the stock market. Therefore, monetary policy is not one of the main causes of the volatility in China's stock market. For this reason, news articles related to the announcement of monetary policy changes will not be considered or included in constructing the PRI in this study.

3.5 Evidence from the stock market comments in newspaper columns

After every single trading day, stock market comments in the media are available in official securities newspapers as well as on major financial websites in China. All relevant comments mostly focus on summarizing the performance of the stock index and trading volumes as well as providing some explanations for changes in the stock market. The explanations for big movements in the stock index are essentially able to offer some useful information to identify the causes of the volatility in China's stock market. As a result, based on the news column

articles in the most well-known official newspaper, *China Securities Journal* (CSJ), all relevant explanations are collected to clarify the relationship between government policies and stock market volatility.

3.5.1 Methodology

Following Baker et al. (2014), Figure 3.1 shows the four steps included in the empirical method used to explore the relationship between government policies and stock market volatility. The first step is to set a threshold of daily movements in the SHCI, and the second is to search all dates with big movements of the SHCI that satisfy the set threshold between 2001 and 2016. According to the selected trading days, the next-day CSJ news comments relating to the daily performance of the stock market are collected to extract the reasons for big jumps of the SHCI. Finally, all explanations, which are believed to account for the big movements of the SHCI, are collated in terms of different kinds of government policies.

Despite that the explanations in newspaper column articles are able to provide some useful information to identify the effects of government policies on the stock market volatility in China, there are still some concerns related to the method used in this present study, and required further investigation before conducting the next step.

Figure 3.1 Steps in the Empirical Method

Source: Author's summaries based on the literature.

First, the performance of the SZCI (Shenzhen Component Index) is similar to the SHCI; they have nearly the same time trend as well as variability range on most trading days from 2001 to 2016. Thus, only the SHCI is used to demonstrate the effects of government policies on stock market volatility. Second, in China's stock market, a daily change of 3% or more in the index is regarded as a big movement; not only investors but also stock commentators are highly concerned about the causes. As a result, there are many stock market-related comments

available in financial newspaper columns that are written by staff correspondents and professional analysts to explain the causes of the big stock index movements.

Table 3.6 A Description of the Different Kinds of Government Policy

Policy Category	Description
Monetary Policy	1. Adjustments to the deposit-reserve ratio 2. Adjustments in interest rate 3. Changes in the discount rate of the central bank 4. Liquidity injections by open market operation 5. Official announcements about the government's stance on future monetary policy 6. Market rumours about changes in monetary policy[34] 7. Other extraordinary actions taken by the monetary authority
Fiscal Policy	1. News reports or concerns about the growth of fiscal revenue and expenditure 2. Unusual government spending and its consequences 3. Changes or potential changes in taxes or the taxation system 4. Liquidity injections by the Ministry of Finance 5. Official announcements about the government's stance on future fiscal policy 6. Market rumours about the changes in fiscal policy 7. Other extraordinary actions taken by the Ministry of Finance
Regulatory Policy	1. Release of new securities regulations or laws 2. Reformation of regulatory rules 3. Regulatory activities of CSRC 4. Official comments about stock market regulations 5. Market rumours about the changes in regulatory policy 6. Regulator's market intervention under special circumstances 7. Changes in shares transaction tax[35] 8. Other reports, concerns and comments on regulatory policy
Other Economic Policy or Policy Expectations	1. News, reports and comments on newly released economic data or economic growth in future 2. New national strategies for economic development 3. Policy measures related to housing price control 4. Release of specific industrial policy or regional economic policy 5. Market expectation for changes in economic policy 6. Other events related to economic policy

Source: Author's summaries based on the literature.

An index change of 5% or more is regarded as a remarkably abnormal movement that is always believed to be caused by some important policy event, such as changes in the stock transaction tax, important speeches of CSRC's president, and central government

[34] According to results reported in previous studies such as Bommel (2003), Zhao et al. (2010) and Zivney (1996), market rumours have a significant impact on the volatility of stock markets. It is not uncommon to see that market rumours about changes in government policy account for a considerable amount of big movements of the stock market index in China (Zhao et al, 2010).

[35] Share transaction tax is categorized as regulatory policy rather than fiscal policy because it intentionally aims at adjusting the stock market in China.

announcements on the future development of the capital market. Thus, for this study, daily changes of 3% and 5% in the SHCI are chosen as the thresholds for selecting the trading days with abnormal stock market movements.

Third, the causes of every big movement of the stock index are identified based on explanations in at least three articles written by different classes of author such as staff correspondents, professional analysts and securities researchers. The explanations are confirmed and recorded as the major causes of the stock index movements if at least two of the three explanations are consistent and confidently reported as the trigger of market jumps.

In some cases, there are no corresponding next-day reports available in the *China Securities Journal* for selected trading days. To solve this problem, three other major securities newspapers, *Shanghai Securities News*, *Securities Daily* and *Securities Times*, are chosen to collect explanations for the big stock index movements. A few extreme cases will be marked as 'no specific reports' if no explanations are available from the four newspapers.

Fourth, all explanations for big stock index movements are classified in terms of different kinds of government policy (see Table 3.6). The explanations will be recorded as 'non-policy' if none of the four policy kinds identified is considered the main cause of big changes in the stock market index. The first consistent explanation will be coded as the main cause of a daily index jump if two or more reasons are cited for explaining a big index movement.

Finally, the proportions of the different kinds of explanation are calculated and the results are used to display the different contributions of the four types of government policy to big movements of the SHCI. Given the problem of the availability of online newspaper articles, the sample period for this study covers only January 2001 to March 2016.

3.5.2 Results and main findings

There were 254 times with a big stock index movement on the Shanghai Stock Exchange in terms of the ±3% change threshold in the daily SHCI. Figure 3.2 shows the big index movements caused by government policy (dark bars) and the non-policy caused movements (medium-tone bars). According to Fig. 3.2, over two-thirds of the big index movements in the sample period occurred in 2007, 2008, 2009 and 2015; the amounts of big index movements are 35, 65, 27 and 43, respectively.

Based on the news articles closely related to market reviews of daily stock trading on the Shanghai Stock Exchange, all explanations of the big index movements are collected, and the

summarized information is presented in Table 3.7. According to results in Table 3.7, 151 of 254 big index movements were caused by different kinds of government policy with a proportion of 0.6; i.e., over half of the big index movements were caused by government policies during the study sample time.

Among the four types of stock market-related policies, regulatory policy contributes to half of the big index movements caused by government policy, followed by monetary policy. Fiscal policy accounts for only three times of the big jumps in the SHCI in nearly 16 years while 40% of the big index movements were caused by market forces other than government policy.

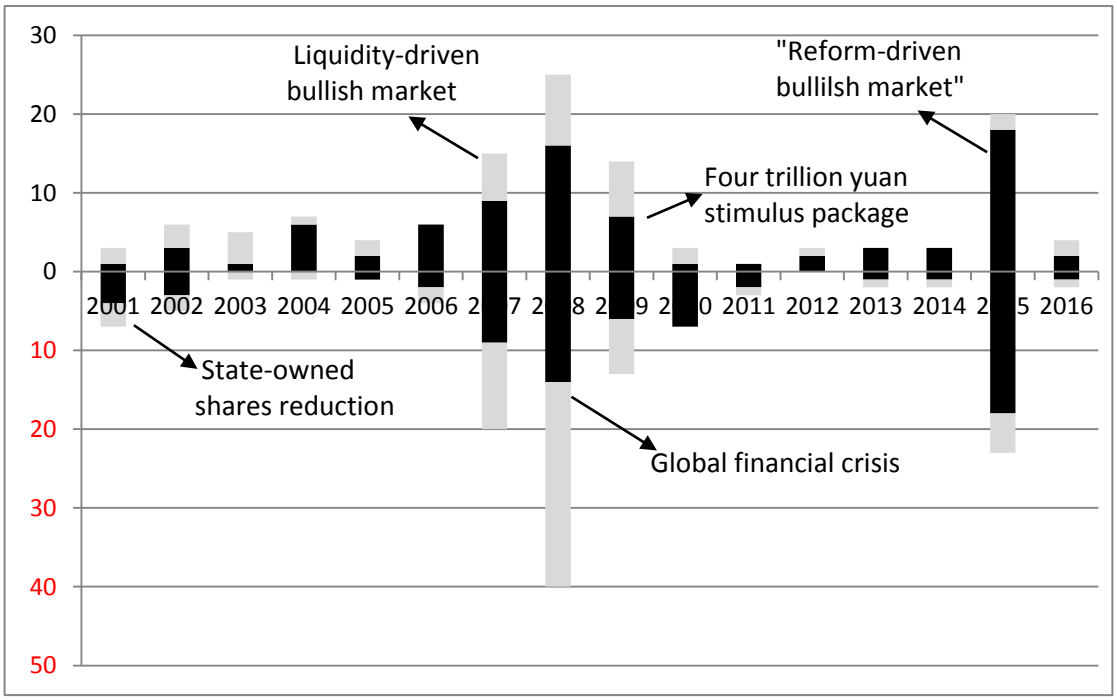


Figure 3.2 Yearly Count of Daily Stock Market Movements of the SHCI[36]

Note: The threshold of daily index movement in the SHCI is ±3%.

Source: Author's summaries based on the *Wind database*.

Based on detailed information in relevant articles, the results show that only seven times were big index changes caused by monetary policy implementation; four times by a reserve ratio adjustment and three times by an interest rate adjustment by the Central Bank of China. Therefore, 34 of the 41 monetary policy-related index jumps resulted from the market expectations of stock investors or by market rumours about possible future changes in monetary policy. The result implies that policy-related concerns are more likely to affect market sentiment and investors' decisions rather than publication of monetary policy

[36] The sample time is from January 2001 to March 2016. The figure is drawn based on the data collected from Wind Database, and the detailed information is shown in Appendix Table: D.1.

adjustments in China's stock markets. In addition, compared with daily regulatory activities and the release of new regulations and laws, active market intervention by regulatory authorities relatively easily causes more uncertainty in the stock market and thus results in more big movements in the SHCI.

Table 3.7 Causes of Big Movements in the SHCI

Explanation	Policy Category	Counts	Percentage (%)	Percentage (%)
Causes related to government policy	Monetary Policy	41	16	60
	Fiscal Policy	7	3	
	Regulatory Policy	**75**	**30**	
	Other Economic Policy	28	11	
	Non-policy	103	40	40
	Overall	**254**	**100**	**100**

Note: The threshold of the daily index movement is ±3%.

Source: Author's calculation based on the article counts in the CSJ.

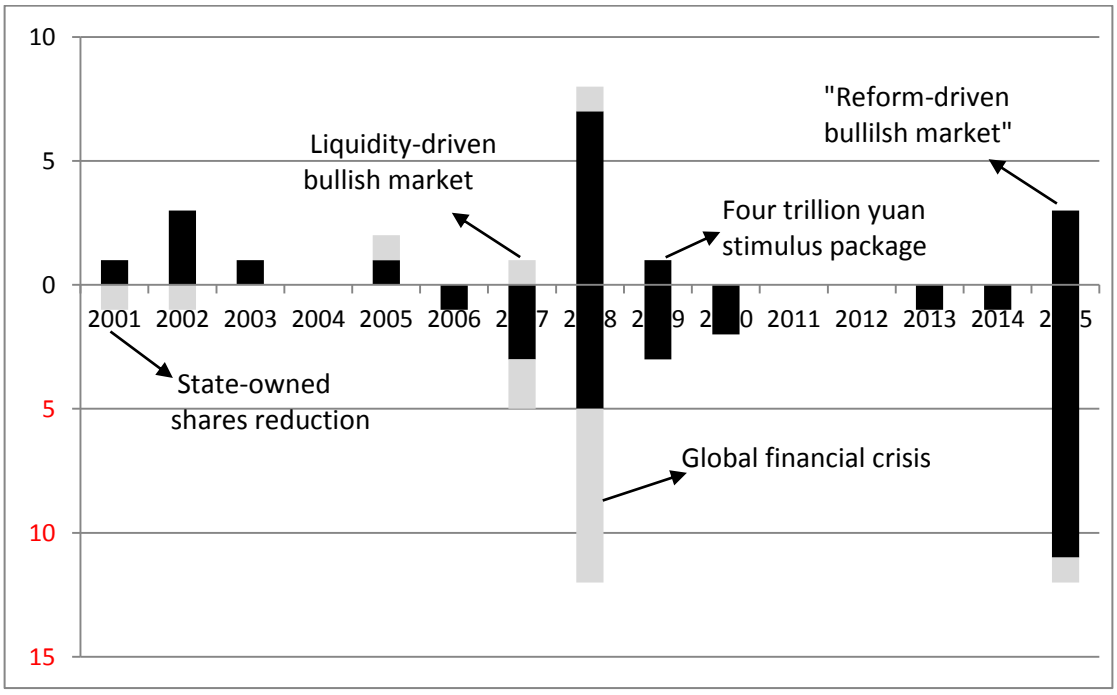


Figure 3.3 Yearly Count of Daily Stock Market Movements of the SHCI[37]

Note: The threshold of daily index movement is ±5%.

Source: Author's summaries based on the *Wind database*.

An index movement of 5% or more means the stock market is filled with extreme sentiments of stock investors. During this study's sample period from 2001 to 2016, there were 60

[37] The sample time is from January 2001 to March 2016. The figure is based on data collected from the Wind Database;detailed information is shown in Appendix Table D.2.

trading days with abnormal stock index movements on the Shanghai Stock Exchange in terms of a ±5% threshold change in the SHCI. Figure 3.3 shows the abnormal movements; those largely caused by government policies displayed by dark bars and the non-policy-caused movements by medium-tone bars.

According to the information in Figure 3.3, 2008 and 2015 account for 60% of the abnormal index movements in the sample of over 15 years; there were 22 and 14 abnormal index movements in 2008 and 2015, respectively. Figure 3.3 also shows the global financial crisis in 2008, which resulted in huge stock market volatility in the US as well as in China. In 2015, it is believed that severe government interference was the major cause of the abnormal fluctuations in China's stock market (Cui & Yi, 2016).

Table 3.8 The Causes of Abnormal Movements in the SHCI

Explanation	Policy Category	Counts	Percentage (%)	Percentage (%)
Causes related to government policy	Monetary Policy	7	12	77
	Fiscal Policy	3	5	
	Regulatory Policy	**30**	**50**	
	Other Economic Policy	6	10	
	Non-policy	14	23	23
	Overall	**60**	**100**	**100**

Notes: The threshold of the daily index movement is ±5% .

Source: Author's calculation based on the article counts in the CSJ.

Based on newspaper articles related to the daily performance of the stock market, explanations for all the huge jumps in the SHCI are collected and classified in terms of the different types of government policy. Table 3.8 presents the abnormal index movements by policy category for the Shanghai Stock Exchange from January 2001 to March 2016. According to the results in Table 3.8, 46 of 60 abnormal index movements were caused by different kinds of government policy, an overall proportion of 0.77, which indicates that over three-quarters of the abnormal index movements were caused by government policy during the sample period.

Among the four types of policy, regulatory policy contributed 65% of the huge index movements, followed by monetary policy, with 15%, of the abnormal index movements. Fiscal policy accounted for only 5% of the huge jumps in the SHCI in nearly 16 years and 10% of the abnormal index movements were caused by other kinds of economic policy. Further, 14 of the 60 huge index jumps resulted from the global financial crisis or other market forces.

This implies that regulatory policy was the main cause of the abnormal index movements in China's stock market even though the great global financial crisis occurred during the sample period.

During the stock market crash of 2015 in China, regulatory policy contributed to over 80% of abnormal index movements. According to explanations in newspaper articles, official comments about the regulation of margin trading and the stock market bailout resulted in over 10 of the abnormal jumps in China's stock market in June-August 2015.

Similarly, according to explanations extracted from the stock market comments in the CSJ, only one of seven huge index changes were caused by an adjustment to the deposit-reserve ratio. The other six monetary policy-related index jumps resulted from market expectations and market rumours relating to the future changes in the monetary policy.

In summary, we can conclude the following:

First, policy risk or uncertainty is the major cause of unusual volatility in China's stock market. As identified by the analysis above, with both ±3% and ±5% threshold settings, over half of the big index movements of the SHCI were closely related to different kinds of government policy. The proportion of policy-caused movements could be over 80% if all the jumps caused by the global financial crisis in 2008 are excluded from the data. Therefore, it is safe to say that, in practice, most abnormal movements in China's stock market were caused by policy risk between 2001 and 2016 and the proportion could be possibly higher if there were no external financial shocks.

Second, among the different kinds of government policy, regulatory policy is the most significant factor in triggering huge market volatility; it gradually strengthens market expectations and results in the policy-driven effect in China's stock market. The results imply that market participants are remarkably sensitive to the regulator's attitudes as well as regulatory activities towards the stock market.

Third, compared with the disclosed monetary policy implementation, market expectations and market rumours of possible adjustments in monetary policy are more likely to influence volatility in the stock market. This means that the risk or uncertainty caused by policies rather than policies themselves is the main cause of fluctuations in China's stock market.

Last, official comments about the stock market can possibly cause big movements in the stock index. In China, under special political circumstances, frequent official comments are usually

considered a prelude to a significant looming policy change. As a result, the effect of open mouth operation can significantly influence the volatility of China's stock market. For example, to stabilize investors' expectations of the stock market, the president of CSRC, Shiyu Liu, commented on the potential exit of CSFC (China Securities Finance Corporation, which was founded by the central government of China on 28 October, 2011, with the aim to stabilize the stock market) that 'the CSFC will keep functioning in the stock markets for a long time in future'. It is believed this helped smooth stock market volatility[38].

3.6 Summary

There are six major types of policy event that could possibly cause market uncertainty and investment risk on China's stock market. The regulations and laws on stock markets are formulated to create and maintain a fair, transparent market environment for all market participants. System reformation in China, including the introduction of new trading rules, changes in current regulations, and systematic transformation of the regulatory framework, is one of the major causes of stock market volatility. Economic, legal and administrative regulatory measures are usually used by authorities to supervise the behaviour and conduct of investors and investment intermediaries as well as for the offering and trading of securities. Direct government interference and official comments are also frequently involved in stock market issues and play a very important role in regulating China's stock market. Another category of policy event concerning stock market investors relates to adjustments of economic policy including macroeconomic, regional development and industrial policies.

Theoretically, there are four channels through which policy events can force an impact on shares prices in stock markets. These four channels include adjustments of stock supply and demand, improvement in the market environment, expectation guidance and trading intervention. Comparing actual daily movements with implied changes in the SHCI, the influence of monetary policy adjustments on stock market performance is empirically investigated. The results suggest that, in practice, there is no strong evidence to support the view that the implementation of monetary policy has a significant impact on the performance of China's stock markets. This implies that monetary policy implementations that are already announced could barely induce any uncertainty in the stock market.

The explanations for the big stock index movements extracted from newspaper articles can provide useful information to identify the main causes of the volatility in China's stock

[38] Source: Securities Times, 12/03/2016, http://news.cnstock.com/event/2016lh/2016lhzb/201603/3733707.htm

market. Based on newspaper articles in the CSJ, all the relevant explanations are collected to analyze and clarify the relationship between government policies and stock market volatility. According to the empirical results, four conclusions can be drawn:

(1) Policy risk is the major cause of unusual volatility in China's stock markets since over half of the big movements of the SHCI in the sample period were closely related to different kinds of government policy.

(2) Among the different types of government policy, regulatory policy is the most significant factor in triggering huge market volatility because market participants are remarkably sensitive to the regulator's attitude towards the stock market in China.

(3) Compared with monetary policy implementation, market expectations and market rumours about possible adjustments to monetary policy are more likely to influence the volatility of the stock markets.

(4) Official comments are likely to result in big movements in China's stock markets because they are usually considered a prelude to a later policy change for market participants.

According to the results discussed above, policy-related risk or uncertainty in China's stock market is mainly caused by four types of policy event. These events are closely related to government intervention, official comments, regulatory activities and market expectations or market rumours about future changes in stock-related policies[39]. The four major sources of risk in China's stock market will be further explored in the next chapter to develop the PRI.

[39] In China, regulatory activities, administrative intervention and official comments are normally considered as strong signals of policy changes, and these remarks or interventions can be influential as much as other policy events.

Chapter 4

The Measurement of Policy Risk in China's Stock Market

4.1 Introduction

To investigate the effect of policy risk on China's stock market, this chapter attempts to develop a proxy policy risk index (PRI) to measure the risk and/or market uncertainty caused by stock market-related policies. Section 4.2 discusses the method used to construct the PRI. Section 4.3 develops the PRI for China's stock market. Section 4.4 addresses some underlying concerns about the accuracy, reliability and consistency of the PRI. Section 4.5 compares the PRI with the EPU-China index. The final section summarizes the chapter.

4.2 Methodology

To the best of our knowledge, there is no globally existing proxy index available to measure policy risk or uncertainty in stock markets. Because of the difficulty in quantifying policy risk directly, an alternative indirect measurement will be developed in this study. Following a method used by Baker et al. (2016) to develop an index of economic policy uncertainty (EPU)[40], construction of the PRI is based on the frequency of newspaper articles relating to the policy risk and/or uncertainty in China's stock market.

The logic of the method proposed in this chapter to measure policy risk is based on an important assumption that the media are the messengers able to capture the uncertainty caused by government policies (Alexopoulos & Cohen, 2009). More specifically, there is consistent correspondence between the frequency of policy risk-related news reports and underlying market risk and/or uncertainty caused by the government policies in China's stock market.

The construction of the PRI includes the four main steps shown in Figure 4.1. First, sample newspapers are selected based on four criteria (see Fig. 4.1), which are used to ensure the authority, availability and accuracy of the extracted information from the news articles. Secondly, a Key Term Library (KTL) is built based on reading sample news articles and high-frequency term filtering. The Key Term Sets (KTS) drawn from the KTL are tested to determine the final KTS for the next step of article searching. Thirdly, a news article search is conducted in the China Core Newspapers Full-text Database (CCNFD) in terms of the selected KTS and Retrieval Expression Grammar (REG), which contain deliberately selected

[40] The EPU index has already been embodied in commercial databases such as Bloomberg, FRED, Haver and Reuters. Also, a number of published academic works using the data of EPU index suggest that the EPU index contains useful information for researchers and a range of decision makers.

key terms. Subsequently, a complete audit reading is performed to ensure the accuracy of the final article counts. Finally, the PRI is computed and normalized based on those counts.

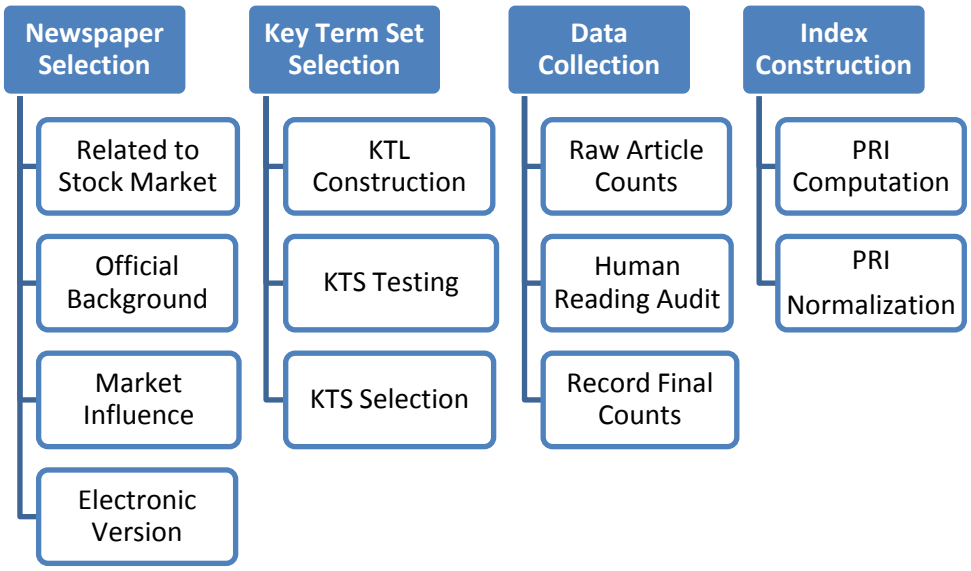


Figure 4.1 Process of PRI Construction

Source: Author's summaries based on the literature.

4.3 Construction of the PRI

4.3.1 Newspaper selection

As discussed in Chapter 3, the PRI is aimed at capturing the four different kinds of risk and/or uncertainty caused by regulatory policies or official comments related to China's stock market. To obtain reliable articles and useful information, four vital criteria (Fig 4.1) are used to select the newspapers that are used to construct the PRI. These criteria are close correlation with stock market news, official background, significant market influence, and availability in electronic form.

4.3.1.1 Relevance of selected newspapers to China's stock market

The PRI for China's stock markets relies on five leading official newspapers: *China Securities Journal (CSJ)*, *Shanghai Securities News (SSN)*, *Securities Daily (SD)*, *Securities Times (ST)* and *Financial News (FN)*[41], which are selected from the 12 most influential financial newspapers (see Appendix Table E.2). Among these newspapers, the first four are rated as the top four securities newspapers in China. They largely publish articles closely related to the securities markets and listed companies as well as providing investment analysis and policy comments. Further, they are designated by the China Securities Regulatory Commission (CSRC) as official media to disclose information on listed companies.

[41] The detailed information about the selected newspapers is presented in Appendix Table E.1.

Table 4.1 Relevance of Selected Newspapers to China's Stock Market

Year	Ratio (%) (Ratio=Stock market-related articles/Total articles*100)						
	CSJ	**SSN**	**SD**	**ST**	**FN**	**ED**	**PD**
2005	10.09	12.09	12.83	13.73	6.85	1.56	0.34
2006	8.89	8.02	11.99	10.26	5.66	1.45	0.23
2007	7.86	9.26	13.68	10.97	6.42	1.11	0.47
2008	6.93	8.54	12.97	8.31	6.14	0.59	0.38
2009	7.90	8.20	12.34	7.46	4.46	0.73	0.34
2010	7.56	7.60	11.99	6.81	3.38	1.16	0.44
2011	6.50	6.12	10.19	6.84	2.57	1.20	0.38
2012	8.12	8.54	11.11	10.94	4.24	1.84	0.58
2013	8.53	9.60	11.43	11.25	4.11	2.94	0.56
2014	9.96	11.63	13.01	12.50	4.57	3.10	0.77
2015	12.07	13.35	15.29	14.92	6.88	2.83	0.58
Average	**8.58**	**9.36**	**12.44**	**10.36**	**5.03**	**1.68**	**0.48**

Notes: (1) Time period: 31/01/2005 - 31/12/2015
(2) Retrieval Expression Grammar (REG): LY = '***Newspaper***' AND (KY = 'Shares' OR KY = 'Stock Market' OR KY = 'Capital Market' OR KY = 'Securities Market' OR KY = 'Equity Market' OR KY = 'Main Board' OR KY = ' Small and Medium Enterprise Board ' OR KY = ' Growth Enterprise Board ')

Source: Author's calculation based on the CCNFD database. https://www.cnki.net.

The *Financial News* is selected as an article source because of its media coverage and close relationship with the capital market. The *Financial News* has a massive, comprehensive influence on the financial market and serves as the "throat and tongue" for policymakers to publicize economic and financial policies in China (see Appendix Table E.1).

All selected newspapers have a close relationship with the stock market in terms of published article topics through the last decade. Table 4.1 shows that the average percentage of stock market-related articles published in four of the five selected newspapers is around 10% and, on average, it is over 5% in the *Financial News* but is usually less than 2% in other economic newspapers, such as the *China Business News (CBN)* and *Economic Daily (ED),* and less than 5‰ in leading comprehensive newspapers such as *People's Daily (PD)* and *Guangming Daily (GD).*

4.3.1.2 Official background of newspapers

An official background is necessary for all the selected newspapers in this study. First, in China, media with a government background are regularly considered as an administrative tool used by regulatory authorities. Consequently, it is not uncommon to see that some important policy decisions, official comments or speeches, and other policy-related

information, which are used to influence the expectations of market participants, are initially published or released by official newspapers funded by the central government.

Secondly, in practice, market participants in China tend to continually keep track of official news sources to obtain policy information on the stock market. At the same time, compared with private media sources, policy information in official newspapers, especially those sponsored by central government, is more influential in leading the expectations of stock investors, thus it is easier to induce risk and/or uncertainty into the stock market (Wang et al., 2012).

Thirdly, news articles published in official newspapers are rigorously supervised by the government to ensure that the preferred words used in the articles are consistent with the public opinion guide. Therefore, compared with the US, the one-party government in China can ensure the uniformity of the news reports; it is essential to make all the policy-related articles in the sample newspapers free of political bias[42].

Table 4.2 Selected Stock Market-Related Newspapers in China

Newspaper	Founding Year	Funder	Website
China Securities Journal	1992	Xinhua News Agency	www.cs.com.cn
Shanghai Securities News	1991	Xinhua News Agency	www.cnstock.com
Securities Daily	2000	Economic Daily	www.ccstock.com
Securities Times	1993	People's Daily	www.stcn.com
Financial News	1987	The People's Bank of China	www.financialnews.com.cn

Note: All the information is obtained from the official websites of the five selected newspapers.

Table 4.2 lists the selected newspapers published by government departments or big media corporations owned and sponsored by China's central government.

4.3.1.3 Market influence

The five selected newspapers have great reputations and influence in media circles of economic and financial news reporting, especially in stock markets, because of the government background and vast daily circulations (see Table 4.3). Besides, all published news articles are also available online and thus have a widespread impact on stock investors.

[42] As discussed in the study by Baker et al. (2013), political slant could skew the newspaper coverage of policy information and thus distort the EPU index if Democrats (Republicans) are in power and right-leaning (left-leaning) newspapers seriously overplay the economic policy uncertainty.

In addition, the five selected newspapers offer an important news source for most leading financial news websites[43] in China, such as *Eastmoney, Hexun,* and *Sina Finance.* Since being released or reproduced instantly by the popular financial news websites, news articles published in the five selected official newspapers have a significant impact on stock investors. For example, some popular financial websites, such as *Eastmoney, CNFOL* and *RoyalFlush Information Network,* have a special news column called "*News Digest of Top 4 Securities Newspapers*" that focuses on summarizing the latest news articles published in the top four securities newspapers, namely *China Securities Journal*, *Shanghai Securities News, Securities Times* and *Securities Daily*.

Table 4.3 Circulation Figures for the Selected Newspapers

Newspaper	Daily Circulation Unit: 10 thousand	Columns	Coverage	Publish Date
China Securities Journal	80	32	Worldwide	Monday – Saturday
Shanghai Securities News	80	20	China	Monday – Sunday
Securities Daily	40	10	China	Monday – Saturday
Securities Times	60	12	Worldwide	Monday – Sunday
Financial News	30	12	Worldwide	Monday – Saturday

Note: The basic information is from the official websites of the five sample newspapers.

As shown in Appendix Table E.3, the number of stock market-related articles in the five selected newspapers accounts for nearly 50% of the total number of articles published in over 500 newspapers collected in the *CCNFD* between 2005 and 2015.

4.3.1.4 Availability in an electronic version

The accessibility of electronic archives of the sample newspapers is critical to make construction of the PRI feasible and efficient. Thus, all the required news articles are obtained from China's biggest newspaper database, *CCNFD,* provided by the *CNKI* (China National Knowledge Infrastructure). Table 4.4 shows the availability of the electronic version for three of the sample newspapers: *China Securities Journal, Securities Times* and *Financial News*, in *CCNFD* from 2000 onwards. Online archives of other two newspapers, *Shanghai Securities News* and *Securities Daily,* are available from year 2005 and 2003 onwards, respectively.

According to the criteria discussed above, the five leading financial newspapers listed in Table 4.4 are chosen as the sample newspapers to construct the PRI. Next, based on a well-functioned key term set, all news articles containing contents of risk analysis or policy-related comments on the stock market are searched and counted to construct the PRI.

[43] See Appendix Table F.1.

Table 4.4 Availability of the Archived Electronic Versions of the Selcted Newspapers

Newspaper	Period of Availability	Format of Full-text
China Securities Journal	**2000 onwards**	PDF & CAJ
Shanghai Securities News	2005 onwards	PDF & CAJ
Securities Daily	2003 onwards	PDF & CAJ
Securities Times	**2000 onwards**	PDF & CAJ
Financial News	**2000 onwards**	PDF & CAJ

Source: Author's summaries based on the CCNFD database. https://www.cnki.net.

4.3.2 KTS selection

To construct the PRI, it is vital to get reliable, consistent, accurate information on news articles in the sample newspapers. First, a key term library is developed by reading stock policy-related news articles such as daily stock market reviews and policy comments. Next, different combinations of key terms are tested by conducting news article searches based on the selected newspaper sample. Finally, a KTS is confirmed and used to perform monthly news article searches.

4.3.2.1 KTL construction

Based on reading over 1000 sample articles in the CSJ from 2000 to 2015, a KTL, including four categories of key terms is created based on filtering of high-frequency words in the news articles. The first category of the key terms includes 16 keywords aimed at searching articles related to the stock market. The keywords include 'financial market', 'securities market', 'stock market' and 'capital market' contained in the KTL because they are interchangeably used when describing stock or share markets in Chinese (see Appendix G.1).

The second category of key terms include10 keywords that mainly focus on searching articles related to regulatory authorities of the stock market. In China, it is not uncommon to refer to regulatory authorities in different forms such as 'managerial authorities', 'regulatory department' and 'policymakers'. Furthermore, the names of the presidents of the CSRC, such as 'Xiaochuan Zhou (周小川)', 'Fulin Shang (尚福林)' and 'Shiyu Liu (刘士余)', are also used to represent the regulatory authorities in news articles.

The third category of key terms is intended to limit the targeted news articles within stock market-related policies, such as comments or analysis of the effects of regulatory policies on the stock market. This category mainly summarizes some important reformations or policies, e.g., 'circuit breaker', 'full circulation' and 'margin trading', involved in the development of

China's stock market. 'Market expectation' and 'market rumour' are chosen as key terms in the third category because both terms are closely connected to market expectations on shares by investors with respect to government policies.

The last category of key terms includes six keywords, such as 'uncertain', 'uncertainty', 'policy risk', 'policy uncertainty', 'risk' and 'risk warning', that concentrate on the risk and/or uncertainty in the stock market. 'Risk warning' is chosen as a key term in the fourth category because it is closely related to policy risk and/or uncertainty in the context of commenting on or analyzing the impact of stock market-related policies.

After developing the KTL (see Appendix Table G.1), different combinations of key terms drawn from the KTL are tested and a final KTS is selected to conduct the article search for the construction of the index.

4.3.2.2 KTS selection

A well-functioning KTS is significantly important to get a stable, accurate count of the targeted articles. However, when performing news article searching, the results of document retrieval are extremely sensitive to inappropriately selected KTSs. To solve this problem, three steps are included in the process of KTS testing.

First, some key terms in the KTL are excluded based on analyzing the substitutability of words within the same category. For example, the names of the presidents of the CSRC are deleted from the KTL because these names are simultaneously included in 'CSRC' when they appear in newspaper articles. As a result, only 'CSRC' is finally selected as an important key term. Most key terms relating to specific stock market-related policies or reforms are also excluded from the KTL since they are covered by broader terms such as 'policy regulation' and 'policy intervention'. The simplified version of the KTL is shown in Appendix Table G.2.

Second, a sample pool of over 1000 articles, manually collected from the CSJ from 2000 to 2015, is set up based on human reading. All the articles are closely connected to policy risk and/or uncertainty in China's stock market [44].

Third, based on the same newspaper and sample period, an article search is conducted repeatedly to test the KTSs using different combinations of key terms from the simplified KTL. Next, a comparison of the sample pool with the test results in terms of different KTSs is made and the match rate is applied to determine the final KTS.

[44] The sample period includes 101 months with 1048 articles collected for the KTS test.

Finally, the test results shows that the best match rate of one KTS is greater than 0.93, and the REG is given by " LY = '***Newspaper***' AND (FT = 'Securities Market' OR FT = 'Stock Market' OR FT = 'Capital Market' OR FT = 'Equity Market' OR FT = 'Financial Market') AND (FT = 'Market Rumour' OR FT = 'Market Expectation' OR FT = 'Policy Information' OR FT = 'Policy News' OR FT = 'Policy Intervention' OR FT = 'Policy Regulation') AND (FT = 'Risk' OR FT = 'Uncertain' OR FT = 'Uncertainty') AND (FT = 'Regulatory Authorities' OR FT = 'Managerial Authorities' OR FT = 'Regulatory Department' OR FT = 'CSRC')" . The selected KTS and REG will be used to perform the news article search in next step.

4.3.3 Data collection

4.3.3.1 Article counts

Using the selected KTS and REG, news articles in the five selected newspapers are searched and counted month-by-month from January 2001 to May 2016[45]. Figure 4.2 shows the results of the article counts[46] of the five sample newspapers. To test the reliability of the method used in this study, more search jobs are conducted with different sample groups of newspapers using the same selected KTS and REG. For the comparison, all article searches are performed from 1 January 2005 to 5 December 2016 because of the availability of the electronic archives for the selected sample newspapers.

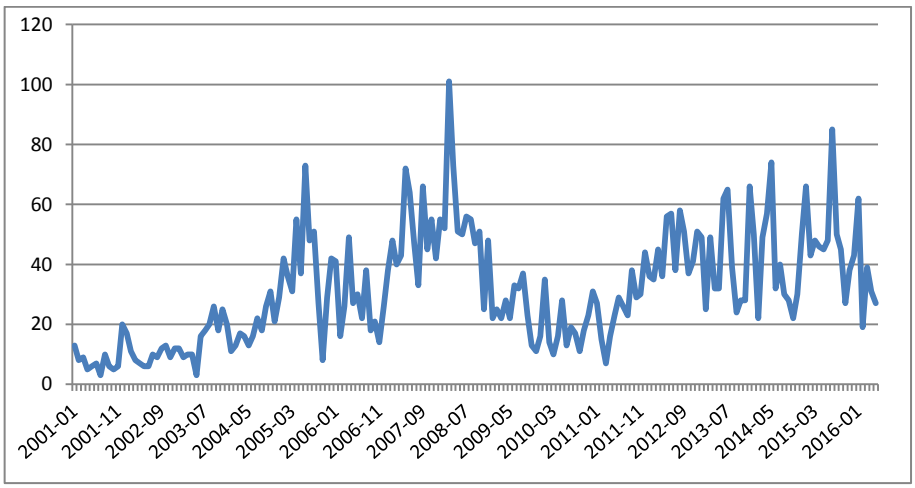


Figure 4.2 Article Counts of Five Sample Newspapers

Source: Author's calculations based on the CCNFD database. https://www.cnki.net.

[45] The reprinted articles are counted as equivalent to adding more weight to some important and influential articles that are repeatedly published in more than one newspaper.

[46] In Figure 4.2, the counts are inaccurate from 01/01/2001 to 12/31/2004 because the electronic version is not available for SSN, 2001-2004, and for SD, 2001-2002. As a result, adjustments will be applied for calculating the PRI in this study.

The five sample newspaper groups are: group A, the top five selected newspapers in the financial area; group B, a single newspaper, CSJ; groups C and D containing five and eight newspapers, respectively, and both in more than one area (e.g., *People's Daily* is a newspaper covering a variety of news topics such as economic, financial, social and political topics); and group E, newspapers in *CCNFD* with a name including any of the following terms: 'securities', 'financial', 'economic', 'finance' and 'economy'. The detailed information on the five groups of the sample newspapers is shown in Appendix Table E.4.

Table 4.5 Correlations of the Counts of Five Groups of Sampled Newspapers

	Group A	Group B	Group C	Group D	Group E
Group A	**1.0000**	**0.7992**	**0.9103**	**0.8994**	**0.9709**
Group B	**0.7992**	1.0000	0.8925	0.8660	0.7389
Group C	**0.9103**	0.8925	1.0000	0.9646	0.8917
Group D	**0.8994**	0.8660	0.9646	1.0000	0.8963
Group E	**0.9709**	0.7389	0.8917	0.8963	1.0000

Source: Author's calculation based on the CCNFD database. https://www.cnki.net.

The correlation coefficients of the article counts are calculated based on the search results in terms of the five groups. Table 4.5 shows that all groups are highly statistically correlated except the coefficient of Groups B and A is less than 0.8. Since Group B includes only one newspaper (the CSJ), the smaller sample might be the main cause of a relatively low correlation coefficient. Figure 4.3 shows that the counts of the different groups display a similar time trend from 2005 to 2015. Therefore, the results suggest that the news-based method used for article search can provide useful, reliable information (Bontempi et al., 2016).

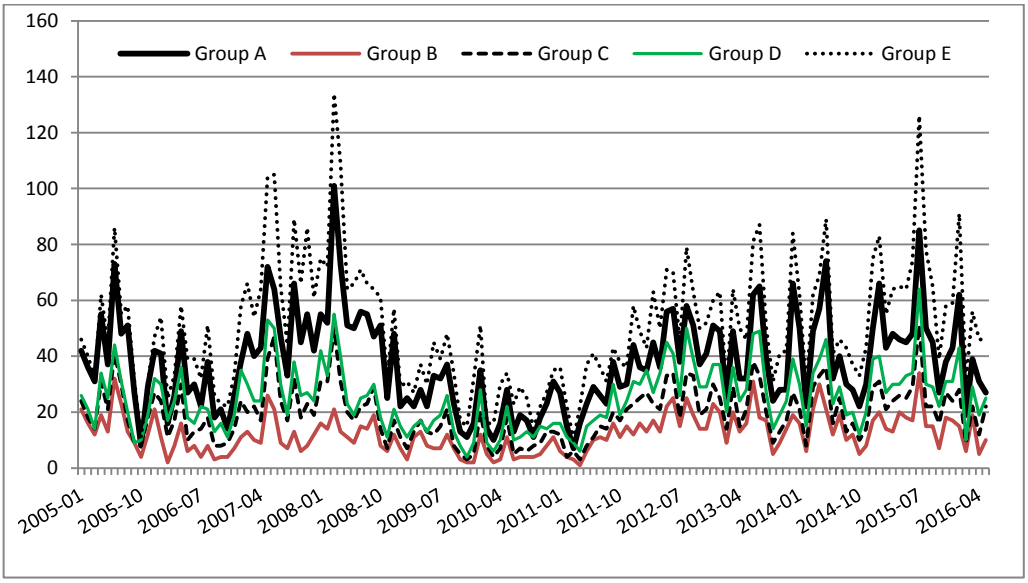


Figure 4.3 Changes in Article Counts of Five Different Sample Groups

Source: Author's calculations based on the CCNFD database. https://www.cnki.net.

4.3.3.2 Human reading audit

To double check the reliability and accuracy of article counts of the five selected newspapers, an audit study of 2116 articles chosen from the CSJ newspaper based on the selected KTS and REG from 1 January 2001 to 5 December 2016 is conducted. The result shows that the accuracy rate of article counts is 0.94 for monthly data.

Following the human reading audit, 127 articles are excluded from the total count of 2116 articles because all are irrelevant to policy risk and/or uncertainty in the stock market. These excluded articles relate to six types of topic: (1) financial report summaries of listed companies; (2) analysis of changes in a single share; (3) comments on the international economy; (4) analysis of industrial policies; (5) comments on changes in overseas stock markets; and (6) analysis of other financial markets such as the insurance and bond markets.

All news articles in the sample newspapers finally included in the count comprise four main categories of topics as follows.

(1) A reprinted policy report

The core contents of policy reports are directly connected to the financial or stock markets and the analysis is mainly about the risk and/or uncertainty in present or future stock markets, or the potential influence of regulatory policies or securities laws on the development of stock markets.

(2) Official speech or interview

Articles relate to official comments about the influence of government policies on the stock market, such as officials' speeches, media interviews, government announcements and spokesman's responses to most concerning questions from reporters. From these articles, the official attitudes about the stock market can be conjectured and thus possibly induce market risk or uncertainty.

(3) Policy-related analysis

News articles, usually written by staff correspondents, professional analysts or researchers, that concentrate on analyzing the potential impacts of regulatory policies or government policy documents on the stock market and intend to present views on the policy risk and/or uncertainty in the stock market.

(4) Daily market review

The counts include a considerable number of news articles from the column 'Daily Market Review' in the sample newspapers. These columns are regularly published and mainly focus on a daily review of stock market changes in securities or financial newspapers such as the CSJ, ST and SSN; some clearly claim that regulatory policies, government intervention or regulation activities are the main causes of the big movements in the stock market.

The results of the human reading audit confirm that the method used in this study is reliable and efficient in providing useful information to construct the PRI for China's stock market.

4.3.4 Calculation of the PRI

The calculation of the PRI is based on three steps: (1) let X_t denote the counts of news articles published in month *t*, and then compute the times-series standard deviation σ for X_t; (2) standardize X_t by dividing through by the standard deviation σ to obtain the value of the PRI_t; and (3) normalize PRI_t by multiplying by 100 to obtain the final time series of the PRI.

Calculation of the PRI differs from Baker et al. (2013) and Baker et al. (2016) in two ways. First, the search and count of articles are conducted monthly together for the five selected newspapers rather than separately and then averaging them. Secondly, the audited article counts are used directly to develop the PRI without scaling by the total number of articles in the same newspapers. The reasons for these differences are discussed in Section 4.4.

Considering the availability of electronic SD and SSN articles in the CCNFD, the PRI for 2001 to 2004 is calculated based on the counts of another sampling newspaper group including: *China Securities Journal (CSJ), Securities Times (ST), Economic Daily (ED), People's Daily (PD)* and *China Business News (CBN)*. Figure 4.4 shows the changes in the PRI for China's stock market. It is clear that there are some spikes corresponding to important policy events that occurred in the stock market, such as the reduction of state-owned shares, reform of the non-tradable shares, changes in the transaction stamp tax, release of the "Guojiutiao (国九条)" news and the stock market bailout in July 2015.

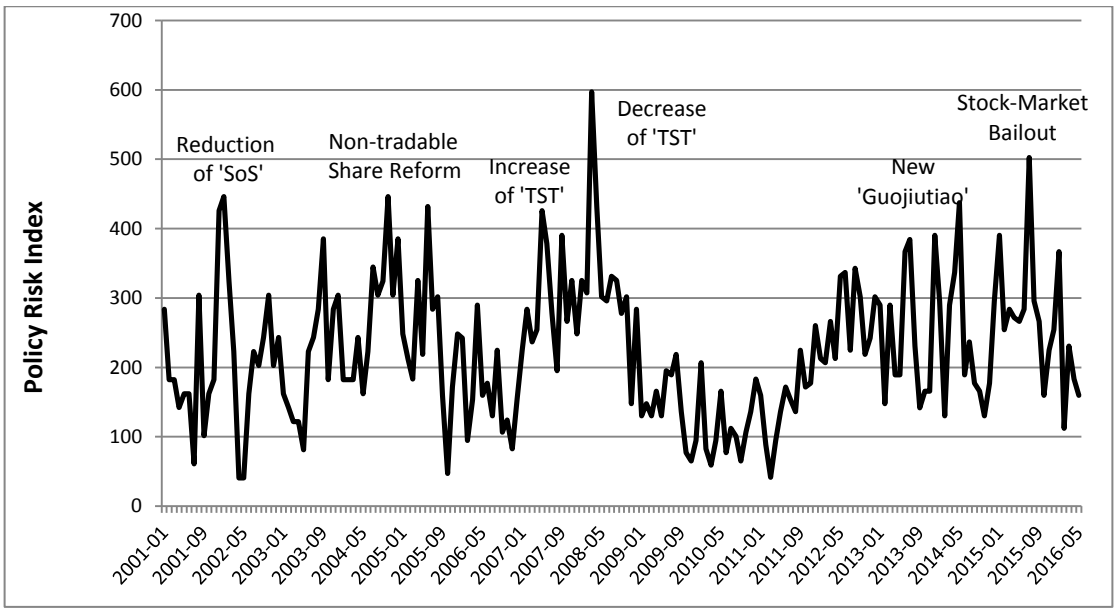


Figure 4.4 The PRI for China's Stock Market

Notes: (1) 'TST' refers to transaction stamp tax. (2) New 'Guojiutiao' refers to the "Guiding Principles for the Healthy Development of the Capital Markets" issued by the State Council of China on May 9, 2014. (3) 'SoS' refers to the State-owned Shares.

Source: Author's calculations based on the CCNFD database. https://www.cnki.net.

4.4 Further discussion on the construction of the PRI

The method to measure policy risk in China's stock markets may raise potential concerns related to newspaper consistency, political bias, article accuracy and the practicality of calculating the PRI. To address these concerns, we need to further discuss the construction of the PRI.

4.4.1 Newspaper consistency

All five selected newspapers have been continuously published for the past 16 years (2001-2016) and the main sections of the newspapers have excellent continuity. As a result, continuity of newspaper's publication is not a major concern in this study. In terms of the availability of online archives of SSN (not available 2001 - 2004) and SD (not available 2001-2003) in CCNFD, another sample newspaper group such as the CSJ, ST, ED, PD and CBN, for which electronic archives are available in CNNFD from 1 January 2001 to 31 May 2016, is used to collect article counts to construct the PRI from 1 January 2001 to 31 May 2004.

Figure 4.5 shows the two sample newspaper groups present a similar time trend in article counts from 1 January 2005 to 31 May 2016; according to the results in Table 4.5, the correlation coefficient of the article counts based on the two groups is 0.91. For this reason,

the PRI for 2001-2004 is based on article counts of the alternative sample newspaper group; the counts are standardized and normalized separately.

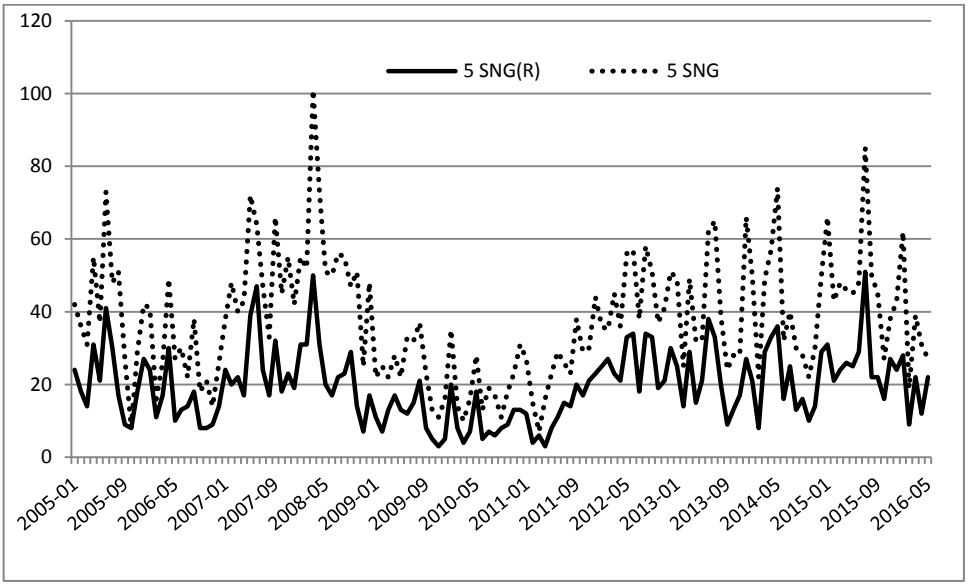


Figure 4.5 Article Counts of the Two Sample Newspaper Groups

Notes: (1) '5 SNG' refers to the five selected newspapers used to construct the PRI in this study.
(2) '5 SNG (R)' refers to the five sampling newspaper group chosen to collect the article counts for 2001-2004.

Source: Author's calculations based on the CCNFD database. https://www.cnki.net.

Based on the above discussion, the issue of newspaper consistency, mainly caused by the availability of electronic versions of news articles, can be resolved by using an alternative sample newspaper group.

4.4.2 Political bias

As discussed in Baker et al. (2013), political bias is a potential issue for index construction based on the frequency of articles in selected newspapers. To investigate the potential political distortion of the PRI, a further exploration of the background of the five selected newspapers, as well as the process of news article censorship before being published, is conducted.

Tables 4.2 and 4.6 show that the five selected newspapers have a strong official background since all presidents and editors-in-chief are appointed by central government to keep a consistent political stance. Moreover, the Chinese government imposes strict censorship on the press, especially nationally published newspapers. The system of 'media supervised by the CPC' requires that all official newspapers need to be consistent with central government in news reporting (Liu, 2012).

Table 4.6 The Official Background of the Five Newspapers in the Sample

Newspaper	Administration	Administrative Rank	President Appointment
China Securities Journal	Xinhua News Agency	Ministry	By central government
Shanghai Securities News	Xinhua News Agency	Ministry	By central government
Securities Daily	Economic Daily	Vice Ministry	By central government
Securities Times	People's Daily	Ministry	By central government
Financial News	The People's Bank of China	Ministry	By central government

Note: All information is from the official websites of the five selected newspapers.

Apart from the strict censorship of the political orientation in news articles, the expression of news articles is also carefully reviewed by the editors to keep it in line with the official language system (Liu et al., 2015). Therefore, there is no reason to believe that political slant could skew newspaper reporting in China in the past 16 years.

4.4.3 Article accuracy

It is essential to ensure that all articles closely relate to policy risk analysis or comments about the stock market. Therefore, a complete audit reading is conducted. As discussed in Section 4.3.3.2, audit reading attempts to confirm that all the targeted news articles counted for the construction of the PRI, must consist of the four main topic categories of reprinted policy reports, official speeches or interviews, policy-related analysis, and daily market reviews. Further, all four categories of article are identified as directly focussing on discussing the policy risk and/or uncertainty in China's stock market.

Finally, taking CSJ as an example, 127 articles are excluded from the final count from 1 January 2001 to 31 May 2016 following human reading. Detailed information on the excluded articles is summarized in Table 4.7.

Table 4.7 Six Types of Excluded Article Based on the Human Reading Audit

Article Topic	Reason for Exclusion	Amount	Percentage (%)
Financial report summaries of listed companies	Irrelevant to current policy or regulatory activities	21	16.5
Analysis of a single share's changes	Irrelevant to the overall stock market	48	37.8
Comments on the international economy	Irrelevant to China or China's stock market	10	7.9
Analysis of industrial policies	Irrelevant to stock market	13	10.2
Comments on changes in overseas stock markets	Irrelevant to China or China's stock market	17	13.4
Analysis of insurance or bond markets	Irrelevant to the stock market	18	14.2
	Total	**127**	**100**

Source: Author's calculations based on the CCNFD database. https://www.cnki.net.

According to Table 4.7, five of the six types of article are excluded from the final counts because they are irrelevant to China's stock market, even though they discuss policy risk related to financial markets or international economies.

Newspaper articles of annual financial report summaries of listed companies are also deleted because the information in these articles normally refers to the risk and/or uncertainty caused by policies or regulatory activities that customarily happened several months ago[47]. In practice, stock investors respond to policy-related news rapidly and thus induce stock market volatility instantly. Therefore, counts including the articles on annual financial reports are inappropriate for computing the PRI for the current month in spite of containing some information closely related to policy risk and/or uncertainty.

In summary, based on the human reading audit, it is helpful to ensure that the article counts are relevant and accurate to produce a reliable proxy index for policy risk in China's stock market.

4.4.4 Calculation of the PRI

The construction of the PRI in this study follows the news-based method developed in Baker et al. (2013, 2016). However, it is different from the scaled counts used to construct the EPU index. In this study, audited article counts are used directly to calculate a PRI for China's stock market. There are four reasons for using this method to calculate the PRI.

First, quite a few news articles, which are periodically published and are certainly irrelevant to present policy risk, can distort the scaled counts. All five sampled newspapers are designated by at least one of the authorities: the CSRC, CIRC (China Insurance Regulatory Commission) and CBRC (China Banking Regulatory Commission) as news publishers for the disclosure of official information of listed companies, insurance firms and banking institutions in China (see Appendix Table E.1). As a result, quite a few articles for information disclosure appear periodically and contribute to a bigger number of total articles that are irrelevant to policy risk and/or uncertainty. These periodically published articles can seriously distort the results of the PRI calculation if the counts are scaled by the total number of newspaper articles. For example, in March 2008, 206 of 2168 articles in the *Securities Times* focused on the information disclosure of listed companies; the percentage of irrelevant articles is 9.5%. In the *China Securities Journal* in April 2008, 77 articles of 2503 are about information disclosure; they account for over 3% of the articles. However, the number of

[47] Normally, annual financial reports of listed companies are reprinted by newspapers in four specific months, March, April, May and June, every year. For example, the reports for 2015 are usually available in the CSJ from March 2016 to June 2016.

articles related to policy risk is only 20 in the *Securities Times* and 12 in the *China Securities Journal*[48]. The calculated value of the PRI would be smaller than it should be if we use the scaled value of the article counts.

Second, for an indirect measurement of the level of policy risk and/or uncertainty in the stock market, it is more practical to use the absolute number of policy risk-related articles rather than scaled counts that are calculated by dividing the number of target articles by the total number of published articles in the same newspaper (Baker et al., 2014). In practice, for daily newspaper articles, it is the frequency (or coverage) and content of the articles that are likely to significantly influence investors' expectations of the stock market. However, even though more sample articles might generate a higher value of the ratio, it is hard to believe that the scaled value, which is a ratio of policy risk-related articles to the total articles in the same newspaper, can significantly raise the concerns of investors and impose an important impact on market participants.

Third, as displayed in Figures 4.2 and 4.3, there are no obvious time trends in the article counts from all the sample newspaper groups. Based on the Augmented Dickey-Fuller (ADF) test, the results provide positive evidence to support the contention that all forms of article count are stationary at the 5% level. Moreover, the correlation coefficient shows that there is only a weak statistical relationship between the number of target articles and the total number of newspaper articles. For example, the correlation coefficient calculated on counts of target articles and the total number of published articles in the five sample newspapers is only 0.25. The similar correlation coefficient for the sample newspaper, CSJ, is also less than 0.3. Therefore, there is very little evidence to support the view that the article counts have a significant relationship with the total number of the published articles in the sample newspapers.

According to the estimated results based on the regression of article counts on the total number of newspaper articles (see equation 4-2), a high correlation between the article counts Y_t^{count} and policy events X_t^{policy} suggests that it is reasonable and plausible to use audited article counts to compute the PRI in this study. Theoretically, assuming no political bias or other unknown factors, a higher article count is possibly caused by a bigger total number of published articles as well as a higher level of risk or uncertainty caused by newly introduced stock market-related policies, policy activities, or both. The potential relationship of these three factors can be given by the following regression model:

[48] Source**:** Author's calculations based on the CCNFD database. https://www.cnki.net.

$$Y_t^{count} = \alpha + \beta_1 X_t^{total} + \beta_2 X_t^{policy} + \mu_t \quad (4\text{-}1)$$

Where Y_t^{count} and X_t^{total} denote the article counts and the total number of news articles in the sample newspaper, respectively; X_t^{policy} is a dummy variable that reflects whether any important stock market-related policy events occur; $X_{policy} = 0$ when no important policy events occur in one calendar month, and $X_{policy} = 1$ when at least one important policy event occurs in the stock market in a calendar month; Y_t^{count} and X_t^{total} data are collected from the CCNFD; X_t^{policy} data are collected from an online column named '*Important Policy Events in Stock Markets*' on the official website of the CSRC[49]. The results of the ADF test suggest that Y_t^{count} and X_t^{total} are stationary. The results of the OLS estimation are given as follow:

$$Y_t^{count} = 0.9806 + \underset{(10.3956)}{0.0058} X_t^{total} + \underset{(7.3413)}{16.2592} X_t^{policy} \quad (4\text{-}2)$$

Based on the t-statistics (shown in the parentheses) in equation (4-2), the coefficients of two explanatory variables are both highly statistically significant. The coefficient of X_t^{total}, 0.0058, indicates that an increase of 10000/100 articles in the total number causes an increase of only 58/0.58 articles in the article counts. Comparatively, according to the estimated coefficient of X_t^{policy}, the occurrence of stock market-related policy events has an economically significant effect on the article counts. Compared with $X_{policy} = 0$, the economically significant coefficient of 16.2592 indicates that the occurrence of important policy events results in an increase of over 16 articles in the monthly counts of target articles in the sample newspapers.

The regression results strongly support the idea that policy events are the main causes of changes in the monthly article counts rather than the total number of articles in the sample newspapers. That is, more policy events can induce more newspaper articles that focus on commenting on or analysing the potential policy risk and/or uncertainty in the stock market.

In summary, audited counts should be more suitable for calculating the PRI than counts scaled by the total number of articles in the sample newspapers.

[49] The important policy events include official release of regulatory policies, laws and documents of the State Council related to the development of the stock market, changes in transaction stamp tax and other regulatory activities that may cause changes in the market participants' expectations.

4.5 A comparison of PRI and EPU

To the best of our knowledge, there are no existing similar indices related to China's stock market to enable us to evaluate the PRI developed in this study. An alternative choice is to compare the PRI with the EPU index built by Baker et al. (2013, 2016). Figure 4.6 displays the EPU-China index and the PRI developed for China's stock markets. The correlation coefficient of the two indices are 0.12 and is relatively small. This implies that policy risk in China's stock market is relatively independent of economic policy uncertainty. This can be partly confirmed by the fact that the performance of the stock market can barely act as a barometer of economic development in China (Han & Wu, 2003).

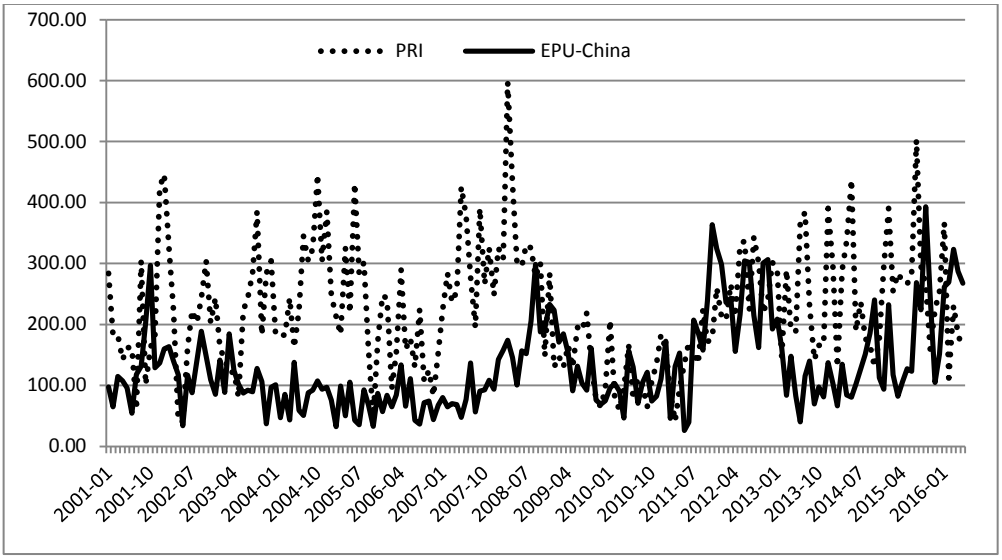


Figure 4.6 A Comparison of the PRI with the EPU-China Index

Source: EPU-China: http://www.policyuncertainty.com/.

The PRI differs from the EPU index in three main ways in spite of the fact that both are based on the frequency of article published in sample newspapers. The first difference is the method used to construct the PRI. As discussed in Section 4.4, construction of the PRI is based on audited counts rather than scaled article counts used by the EPU-China index.

Secondly, the two indices focus on different kinds of policy risk and/or uncertainty in the economy, so function differently. The EPU-China index attempts to measure the economic policy uncertainty in China whereas the PRI intends to provide a proxy index for policy risk in the stock market. Apparently, the two types of government policy aim at different targets. Economic policies regarding the EPU-China index are implemented to smooth fluctuations of the overall economy. The construction of the PRI focuses on the regulatory policies (or activities) that are limited to the stock market rather than the overall economy and concentrate on stabilizing market volatility in China.

In academic research, the EPU index, an effective measure of the economic policy uncertainty, provides very useful information and has had wide application in the literature, e.g., Brogaard and Detzel (2015), Chen et al. (2014) and Liu and Zhang (2015). However, the information provided by the PRI is more suitable as a proxy index of policy risk in China's stock market than the EPU-China index.

Third, different newspapers are used to build the two indices. The EPU-China index is constructed based on the *South China Morning Post* (SCMP), the leading English-language newspaper in Hong Kong. As is well known, there is still political prejudice resulting from different political systems in Mainland China and Hong Kong even after reunification in 1997. As a result, although it is capable of providing enough sample articles for the index construction in terms of a long history of over 100 years, news articles related to China's economic policies in SCMP might be more easily affected by political slant and so possibly distort the EPU-China index. As discussed in Section 4.4, the PRI constructed in this study is based on the five leading official newspapers that are strictly supervised by China's central government. As a result, the strong official background helps to make the PRI free of political slant so can produce a more reliable proxy index than the EPU-China index.

In a conclusion, the PRI is an important supplement to the measurement of different types of policy uncertainty in the economy. The EPU-China index provides useful information for exploring the impacts of economic policy uncertainty on the performance of the overall economy. To identify the effects of government policies on the stock market in China, the PRI offers a suitable proxy variable for our empirical investigation.

4.6 Summary

In this chapter, based on the frequency of news articles published in five official newspapers, the PRI is developed to measure the policy risk and/or uncertainty in China's stock markets. The continuity of publication time and news columns is crucial to the consistency of our sample newspapers and the official background of those newspapers keeps the policy-related articles free of political slant. A human reading audit enables us to obtain accurate counts for the construction of the PRI. Based on correlation analysis and a multivariate regression model, the empirical results provide solid evidence that the final audited article counts can help provide useful information to develop the PRI for China's stock market.

Based on a comparison with the EPU-China index, the results show that the newspapers used in this study are more reliable than the SCMP used in developing the EPU-China index.

Moreover, different from the EPU-China index, which mainly applies in economic policy uncertainty related to the macro economy, the PRI concentrates on offering a suitable proxy index to measure the policy risk in the stock market.

In summary, to explore the impacts of the policy risk and/or uncertainty on the stock market in China, the PRI can provide an acceptable proxy variable to further empirical investigation though the EPU-China index has been widely applied to examine the effects of economic policy uncertainty in previous studies.

Chapter 5

The Effect of Policy Risk on Stock Market Volatility

5.1 Introduction

This chapter provides some new evidence for the most concerning issue whether China's stock market is a policy-driven market. To identify the impact of policy risk on the volatility of the stock market, multivariate regression models, including the PRI as an important explanatory variable. are estimated in terms of the different Chinese market conditions such as bullish and bearish times.

Section 5.2 discusses the causes of the volatility in China's stock market from three aspects of policy risk and/or uncertainty, macroeconomic conditions and stock market-specific factors, and three hypotheses are proposed based on the analysis. Section 5.3 defines the dependent and independent variables included in the analysis. The empirical models and data are presented in Section 5.4 and Section 5.5 estimates the effects of policy risk on the volatility of China's stock market. The last section concludes the chapter.

5.2 Theoretical analysis and basic hypothesis

Theoretically, apart from the stock market-specific factors such as dividends and the profitability of listed companies, macroeconomic conditions play a potential role in the performance of stock markets as well as different types of risk and/or uncertainty related to stock markets and the economic environment. In this section, a theoretical analysis is conducted to identify the potential impacts of these factors on stock markets and hypotheses are developed.

5.2.1 Theoretical analysis

5.2.1.1 Macroeconomic conditions

According to the literature, such as Campbell and Ammer (1993), Chatziantoniou et al. (2013), Chen et al. (2010) and Sun and Ma (2003), some important macroeconomic factors can exert a significant effect on the volatility of stock markets, e.g., changes in the interest rate, exchange rate and inflation rate, economic development indicators of industrial production, international trading and total retail sales, money supply and the fiscal deficit.

Table 5.1 The Relationships between Macroeconomic Factors and Stock Markets

Macroeconomic Factor	Relationship	Macroeconomic Factor	Relationship
Interest Rate	-	Inflation Rate	-
Exchange Rate	unsure	Money Supply	+
Economic Growth	+	Fiscal Deficit	-

Notes: '-': negative relationship; '+': positive relationship. For exchange rate, 'unsure' means the exchange rate performs inconsistently across the world because of different economic conditions.

Source: Author's summaries based on economic analysis.

Table 5.1 summarises the relationships between macroeconomic factors and stock markets; the positive/negative relationship implies that the increase/decrease in the macroeconomic factor results in an increase/decrease in the stock market index. Generally, the interest rate level imposes a remarkable influence on stock market in two ways (Chen et al., 2010; Rigobon & Sack, 2003). On one hand, an expansionary monetary policy is treated as favourable news for market participants because boosting liquidity and lower interest rates help reduce the financing costs of listed companies so improving their earnings and share value. On the other hand, a decrease in interest rate is likely to encourage depositors to withdraw money to invest in the stock market for higher returns. It is common to see this phenomenon in China because there are limited types of investment available to investors to choose in the financial market. Similarly, adjustments of the money supply can change the interest rate level and have a significant influence on the stock market (Chatziantoniou et al., 2013; Nave & Ruiz, 2015).

The influence of the exchange rate on stock markets is somewhat ambiguous. The appreciation of the local currency is harmful to the promotion of exports but can be helpful in attracting more capital inflows because the market expects further appreciation. Therefore, it is likely to boom the local stock market on the condition that the effect of more capital inflow outweighs that of the reduced exports caused by appreciation of the local currency. However, in economies with strict regulation of capital inflows, appreciation of the local currency can affect the stock market negatively because it possibly reduces the profitability of listed international trading companies. As a result, the influence of the exchange rate on stock markets may differ from one market to another in terms of the specific market conditions.

Generally, a prosperous macroeconomic performance is likely to provide a stable, healthy environment for stock markets. Thus, the rapid growth of industrial production, exports and social retail sales are favourable to the development of stock markets. Comparatively, for stock investors, an increase in the inflation rate is unfavourable news because a higher

inflation rate may lead to a tightening monetary policy such as the contraction of market liquidity or the raising of the benchmark interest rate. Thus, in general, there is a negative relationship between the inflation rate and the performance of stock markets (Hosseini et al., 2011; Omran & Pointon, 2001).

Similarly, fiscal deficit can affect stock markets significantly in some countries or economies. A reasonable level of the fiscal deficit means the economy is in a healthy condition, which helps to stabilize stock markets (Bekhet & bt Othman, 2012; Darrat, 1988). There is a limited number of studies concerning the effect of fiscal deficit in China. For example, Chen et al.'s (2010) and Sun et al.'s (2013) empirical studies concentrate on the impact of fiscal deficit on the stock market and find no evidence to support the idea that fiscal deficit has a close relationship with the performance of the stock market.

5.2.1.2 Stock market-specific factors

The fundamentals of listed companies and the size of the shares' supply are two main reasons contributing to the volatility of stock prices in stock markets. Specifically, improvement in the fundamentals of listed companies is likely to trigger an upward movement of stock prices because a higher profitability of listed companies means a higher investment value, and thus attracts more investors. Conversely, deteriorating fundamentals or an unfavourable financial performance worsen the investment value of shares and induces a downward movement of stock prices (Campbell & Shiller, 1988; Chan et al., 1991).

For the supply of shares in stock markets, more IPOs (Initial Public Offerings) lead to a bigger number of tradable shares, which possibly causes a further downward movement of stock prices under the condition that the amount of invested funds remains unchanged. Conversely, a decrease in the stock supply is likely to *ceteris paribus* cause an upward movement of stock prices.

5.2.1.3 Policy risk and/or uncertainty

In the global financial markets, one common concern of stock investors is closely related to the unpredictable future; i.e., it is the risk and/or uncertainty that plays a crucial role in determining the volatility of stock prices. In practice, there are three types of policy-related risk and/or uncertainty in China's stock market. First, it is the stock market-related policy risk, which is mainly from the regulatory authorities. Secondly, policy risk and/or uncertainty is always closely connected to the economic policies formulated by central government. Thirdly, economic policy uncertainty derived from other economies in the world can also

possibly impose an important impact on the domestic stock market because of the increasing openness of the Chinese economy and financial markets.

In summary, theoretically, the factors discussed above are likely to impose a significant impact on the performance of the stock market. However, in practice, the real effects of the factors on the stock market still remain unknown in terms of the different market environments as well as different time spans. As a result, the factors need to be carefully treated in explaining the volatility of China's stock market.

To investigate the effect of policy risk on the stock market, some important hypotheses have been proposed based on the historical performance of China's stock market.

5.2.2 Hypothesis development

There are some basic facts entrenched in the history of the development of China's stock market. First, with the development of China's capital market, almost every abnormal upward movement of the stock market corresponds to one or more important stock market-related policy events. For example, official announcement of the suspension of the state-owned shares reduction on June 23, 2002, triggered a big jump for the stock market on the next trading day (Lu & Xu, 2004). Similarly, to improve the healthy development of the capital market, two important policy documents, the "Guojiutiao (国九条)" and "New Guojiutiao (新国九条)" , were issued by central government in January 2004 and May 2014, respectively (Wang & Ye, 2011; Zhang & Ye, 2012). As a result, there were two corresponding bullish markets triggered in China's stock market (see Figure 5.1).

Secondly, in China's stock market, a big bullish market triggered by the government's stimulus policies, such as the reform of non-tradable shares and "Guojiutiao (国九条)", is unsurprisingly followed cyclically by a long bearish time. Features of the policy-driven stock market can be seen in the Figure 5.1. More specifically, at the beginning of the cycle, the stock market booms rapidly because of the stimulation by government policy such as the "New Guojiutiao (新国九条)". Next, the authorities try to use regulatory policies, such as restriction on over-the-counter margin financing and the prohibition of the speculative trading to prevent the financial market from being devastatingly shocked by the systemic risk because the stock market is over-heated and the share prices are unreasonably high. At last, the stock market bubble bursts, which unavoidably induces a long period of a bearish market (Xiang & Wang, 2004; Zhang & Ye, 2012). For example, during the 2008 global financial crisis, the stimulus of '4 trillion' RMB in China triggered the bullish market in 2009, but the bullish

time came to an end after several months and the bearish period lasted for around 5 years (see Figure 5.1).

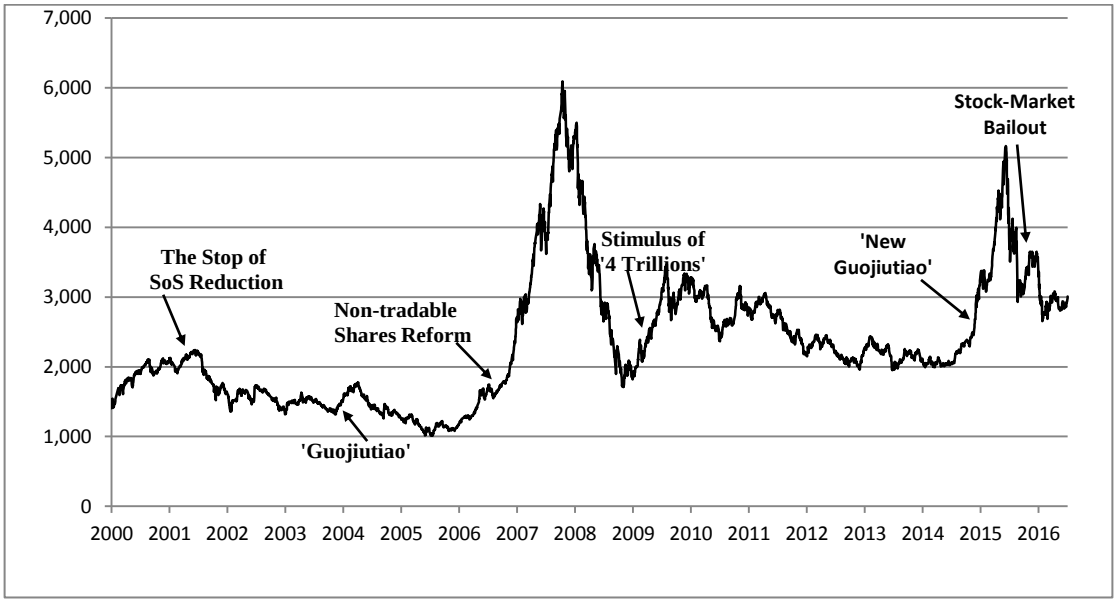


Figure 5.1 Policy Events and Stock Market Volatility in China

Notes: (1) This figure is based on the changes in the Shanghai Composite Index from January 2000 to May 2016.

(2) 'SoS' refers to the state-owned shares.

(3) 'Guojiutiao' refers to the "Guiding Principles for the Healthy Development of Capital Markets" issued by the State Council of China on January 31, 2004.

(4) 'New Guojiutiao' refers to the "Guiding Principles for the Healthy Development of Capital Markets" issued by the State Council of China on May 9, 2014.

Source: Author's summaries based on the *Wind Database*.

Thirdly, according to Figure 5.2, it is obvious that bear markets normally last much longer time than the bull markets in China[50]. For example, the bearish market from 2001 to early 2005 lasted for 48 months and another bearish market from late 2009 to mid-2014 lasted for 58 months. Comparatively, the two bullish markets following the two bearish markets lasted for only 28 and 10 months, respectively.

In addition, a rapid rise of the stock market in China often dramatically ends with a consecutive sharp fall and, subsequently, the bear market normally lasts for over 2 years. At the bottom of the stock market, share prices are relatively insensitive to unfavourable policy news because most tradable shares are oversold after a long-time drop in the stock market (Lu & Xu, 2004).

[50] More statistical information on China's stock market is provided in Appendix H.

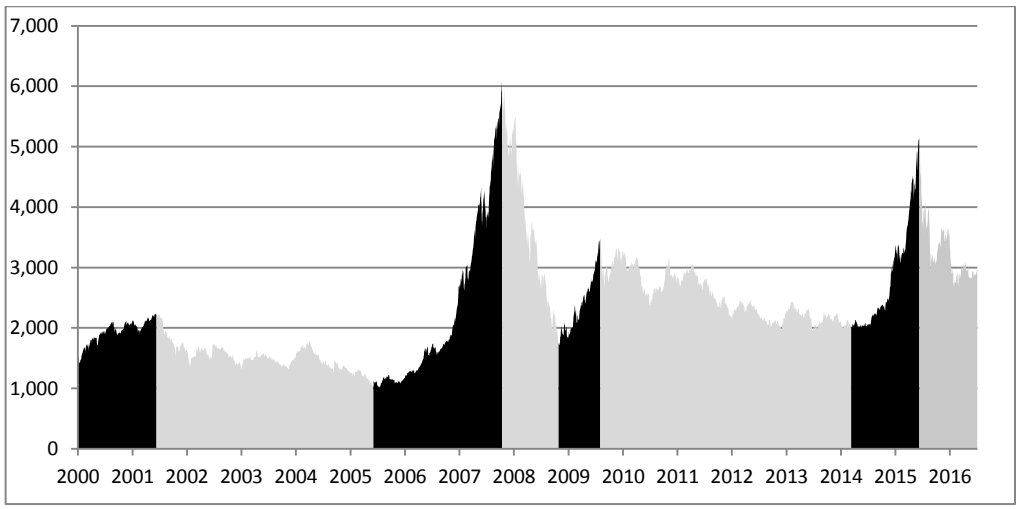


Figure 5.2 The Volatility of China's Stock Market

Notes: (1) The bear markets are shown in grey and the bull markets are shown in black in the figure.
(2) The figure is based on changes in the Shanghai Composite Index from January 2000 to May 2016.

Source: Author's summaries based on the *Wind Database*.

Figure 5.3 shows that the trading volume in bear markets remarkably declines compared with the trading volume in bull markets. In practice, there are quite limited investment options for the investors to choose in China's financial market because of the unavailability of investable financial products. As a result, in bull markets, a massive amount of investment funds flow into the stock market for a quick profit; comparatively, only a very limited number of retail traders remain in bearish markets (Wang et al., 2012; Zhang & Ye, 2012). Therefore, it is not uncommon to see that investment funds frequently flow in and out between commercial banks and the stock market in China (Diao et al., 2011).

In summary, the burst of the policy-driven stock bubble results in a long period of bear markets and causes a big problem of low liquidity in the stock market. To resolve the problem and further promote a healthy and stable development of the stock market, an aggressive policy stimulus is unavoidably employed because central government is anxious to restore the financing function of the stock market to support the real economy. Consequently, another big asset bubble driven by the government policies occurs rapidly and a vicious cycle starts again in China's stock market.

Based on the theoretical analysis in previous section and the discussion above, four hypotheses are proposed.

Hypothesis Ⅰ: Policy risk, indicated by the PRI, has a significant effect on the overall volatility of China's stock market and the effect of the PRI on upward volatility is greater than on downward volatility.

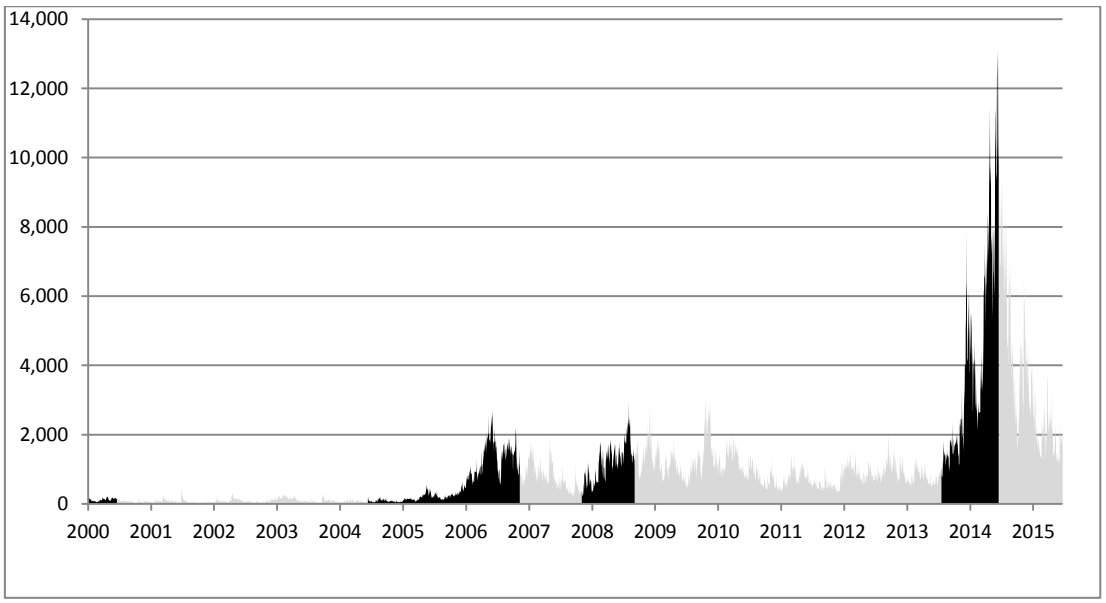


Figure 5.3 Changes in the Trading Volume on China's Stock Market[51]

Notes: (1) Bear markets are shown in grey and bull markets are shown in black.
(2) The figure is based on changes in trading volumes on the Shanghai Stock Exchange from January 2000 to May 2016.

Source: Author's summaries based on the *Wind Database*.

For investors in China's stock market, government policy is a significant determinant of the volatility of the share prices. As a result, market participants are extremely sensitive to official policy news related to the stock market. However, the policy-related sensitivity of investors varies according to stock market performance, such as the bull and bear markets. In practice, unfavourable policy news in bullish times clearly results in volatility of the stock market as does favourable policy news in bearish times (Xiang & Wang, 2004).

To achieve a reputation for their official career and get promotion, regulatory authorities in China have an incentive to boost the stock market by policy instruments rather than suppress them (He, 2004; Lu & Xu, 2004). Commonly, as a result, stimulus policies are officially used to achieve a stable, healthy capital market. Comparatively, there are few cases where the regulatory authority is forced to cool down an overheated stock market by virtue of tightening policies. Consequently, the effect of policy risk is more likely and more frequently to induce upward volatility than the downward volatility in China's stock market (Wang et al., 2012).

Hypothesis Ⅱ: The PRI has a significant effect on the volatility in the bull markets as well as bear markets and the impact of the PRI in the bull markets is greater than in the bear markets.

[51] Trading volumes in 2005 and before are too small to display in this figure; the stock trading volumes for 1990 to 2005 are presented in Appendix Figure H.2.

In China's stock market, the amount of investment funds and number of market participants in bull markets dramatically outnumber that in bear markets; the risk preference of investors is inclined to be more risk-seeking in bullish times than in bearish times (Meng, 2011). As a result, policy news related to the stock market can trigger more uncertainty in bull markets than in bear markets. This is true if a huge number of retail investors, who depend heavily on the policy news to make a quick profit, are more sensitive to policy news and more easily leads to stock market volatility in bullish times than in bearish times. Thus, the impact of PRI in bull markets could be greater than in bear markets.

Hypothesis Ⅲ: The effect of the PRI on downward volatility is greater than on the upward volatility in bull markets.

In the bull markets, most shares are already overvalued after a period of rapid rise, therefore, unfavourable policy news is more likely to trigger a sharp drop in stock prices and make the stock market more volatile. However, favourable policy news cannot boost the stock market any higher because most investors keep their largest holding of shares in bullish times. As a result, there are very limited incremental funds still available to boom the market further. Accordingly, the effect of policy risk on the downward volatility can be greater than on the upward volatility when the stock market is in a bullish phase.

Hypothesis Ⅳ: In bear markets, the effect of the PRI on upward volatility is greater than on downward volatility.

In bear markets, there is a sharp contraction of stock trading volume as well as in the number of investors, especially retail investors because of the lack of the money-making effect (Xiang & Wang, 2004). In bearish times, most shares are undervalued after a long period of decline, therefore, unfavourable policy news can hardly bring much more pressure on stock prices and make the situation worse. Meanwhile, in bearish times, investors with short positions have an abundance of investable funds and wait for good opportunities to invest. Thus, favourable policy news is likely to lead to optimistic expectations in investors and thus trigger a remarkable jump in share prices. Therefore, the effect of policy risk on upward volatility can be greater than on the downward volatility when the stock markets are in a bearish phase.

Based on the developed PRI, the four proposed hypotheses are tested to identify the effects of policy risk on the volatility of China's stock market.

5.3 The definition of the variables

5.3.1 Dependent variable

A multivariate regression model is used to investigate the effect of the PRI on the volatility in China's stock market. Therefore, volatility of the stock market is considered the dependent variable in the regression model.

Monthly standard deviations of the stock index return are used to measure the monthly overall volatility of the stock market. To identify the impact of the PRI on both upward and downward volatility in China's stock market, monthly upside and downside half standard deviations of the stock index return are calculated to measure the upward and downward volatility of the stock market, respectively (Markowitz, 1959; Wang et al., 2012). The functions for computing the monthly standard deviation of the stock index return are as follows:

$$\sigma_m = \sqrt{T}\sigma_d \tag{5-1}$$

$$\sigma_d = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(r_t - \bar{r})^2} \tag{5-2}$$

$$r_t = \ln(\frac{I_t}{I_{t-1}}) \tag{5-3}$$

Where σ_m and σ_d are the monthly and daily standard deviations of the stock index return, T is the number of the trading days per month, r_t and $\bar{r}$ are the daily index return and average daily index return, and I_t is the daily closing stock index.

$$\sigma_m^{upward} = \sqrt{\frac{T}{n-1}\sum_{r_t>\bar{r}}(r_t - \bar{r})^2} \tag{5-4}$$

$$\sigma_m^{downward} = \sqrt{\frac{T}{n-1}\sum_{r_t<\bar{r}}^{\bar{r}}(r_t - \bar{r})^2} \tag{5-5}$$

The functions to compute the monthly upside and downside volatility of the stock market are given by equations (5-4) and (5-5), where σ_m^{upward} and $\sigma_m^{downward}$ denote the monthly upside and downside standard deviations of the stock index return, respectively.

5.3.2 Independent variables

In previous studies, the empirical results are inconsistent in explaining the causes of volatility in stock markets in different economies as well as in different sample periods. For example,

Morelli (2002) finds that changes in macroeconomic factors, such as inflation rate, money supply and industrial production, have insignificant effects on the volatility of stock markets. However, Hamilton and Lin (1996) claim that economic indicators, such as industrial production, help predict the volatility of stock markets. Therefore, apart from the variable PRI, all independent variables included in this study are chosen based on the theoretical discussion in Section 5.2.1 and the literature.

Table 5.2 lists the independent variables included in the regression models. In addition to the study's most concerned explanatory variable, PRI, three categories of factors are specified as the control variables in the study. First, two independent variables $EPUA_t$ and $EPUC_t$ are introduced to capture the effects of economic policy uncertainty of the US and China on the volatility of China's stock market. Second, there are six macroeconomic variables: interest rate, exchange rate, inflation rate, total retail sales, industrial production, and money supply, chosen as control variables to test the influence of macroeconomic factors on the volatility in China's stock market. Generally, there is a close relationship between interest rate and money supply; however, in China, changes in money supply rarely affect fluctuations of the interest rates because of the independent official control of the benchmark interest rates during this study. As a result, both of the interest rate and money supply are preliminarily specified as the control variables.

Table 5.2 A Summary of the Independent Variables

Variable	Definitions
	Category A: Variables of Policy Risk and/or Uncertainty
PRI_t	An index developed in this study to measure the policy risk in China's stock market.
$EPUA_t$	An index based on Baker et al. (2013) to measure economic policy uncertainty in the US.
$EPUC_t$	An index based on Baker et al. (2013) to measure economic policy uncertainty in China.
	Category B: Macroeconomic Variables
INF_t	Inflation rate measured by the consumer price index (CPI).
MS_t	Broad money supply measured by the growth of M_2.
IR_t	Interest rate indicated by 7-day interbank overnight rate.
ER_t	The real effective exchange rate
RS_t	Growth of total retail sales
IP_t	Growth of industrial production
	Category C: Stock Market-specific Variables
SV_t	The volume of shares in circulation
SE_t	Weighted earnings per share

Third, two stock market-specific factors, the volume of shares in circulation and the weighted share earnings are chosen as another two control variables to cover the fundamentals of the stock market. Three other factors, trading volume, price earnings ratio and circulated market value, are not selected as control variables because all three are closely connected to the share prices. Inclusion of these three variables in the empirical analysis might raise concern about the mutual explanation of the explained and explanatory variables. The correlation coefficients of the first two classifications of the explanatory variables are presented in Appendix Tables I.1 and I.2.

5.4 Empirical model and data

5.4.1 Empirical model

The multivariate regression model used to test the effects of the PRI on stock market volatility is as follows:

$$Vol_t = \alpha + \beta PRI_t + \sum_{i=1}^{n} \gamma_i Vol_{t-i} + \sum_{j=1}^{m} \delta_j X_{t,j} + \varepsilon_t \qquad (5\text{-}6)$$

Where Vol_t is the volatility of the stock market measured by the monthly standard deviation of the stock index return, the PRI index is proxy for the policy risk in China's stock markets. ε_t is the error term and X_j represents the control variables such as money supply, inflation rate, interest rate and exchanger rate. Subscript *i* specifies the number of lags, and subscript *j* denotes the number of control variables.

To test the robustness of the estimates, three steps are taken to run the empirical regression in this study:

(1) A bivariate regression model is estimated in which stock market volatility is regressed against its own lagged values and the values of the PRI.

$$Vol_t = \alpha + \beta PRI_t + \sum_{i=1}^{n} \gamma_i Vol_{t-i} + \varepsilon_t \qquad (5\text{-}7)$$

(2) As shown in the equation (5-8), two other variables, *EPUA* and *EPUC* ,are included in the regression model to identify the effects of the PRI as well as the indices related to the economic policy uncertainty on the volatility of China's stock market.

$$Vol_t = \alpha + \beta PRI_t + \sum_{i=1}^{n} \gamma_i Vol_{t-i} + \delta_1 EPUA_t + \delta_2 EPUC_t + \varepsilon_t \qquad (5\text{-}8)$$

(3) The regression model in equation (5-9) is estimated to identify the determinants of China's stock market volatility.

$$\begin{aligned} Vol_t = {} & \alpha + \beta PRI_t + \sum_{i=1}^{n} \gamma_i Vol_{t-i} + \delta_1 EPUA_t + \delta_2 EPUC_t + \delta_3 ER_t + \delta_4 IR_t + \delta_5 INF_t \\ & + \delta_6 IP_t + \delta_7 RS_t + \delta_8 MS_t + \delta_9 SV_t + \delta_{10} SE_t + \varepsilon_t \end{aligned} \qquad (5\text{-}9)$$

To investigate the effects of policy risk on China's stock market volatility in terms of different market conditions, the sample period is divided into two sub-samples, bullish times and bearish times according to the Dow Theory[52]. The three-step process of the empirical investigation is applied to both the bull and bear markets.

5.4.2 Data

Based on data availability for the regression models, our study period is from January 2001 to May 2016. The data for stock market volatility are computed based on the daily index return of the Shanghai Composite Index (SHCI). The PRI is calculated based on the method developed in Chapter 4, and the EPUA and EPUC data are collected from the website of 'economic policy uncertainty'[53]. The required data for the six macroeconomic series and one of the stock market-specific variables, SV, are obtained from the commercial database called *WIND Economic & Financial Database*. The weighted earnings per share are computed based on data collected from the *WIND Database*. The data in Table 5.2 are monthly based.

The descriptive statistics for both the dependent and independent variables are presented in Appendix J. The data used in this study cover 185 months from January 2001 to May 2016. In Appendix J, Table J.1 presents the descriptive statistics of the dependent variables. The average monthly standard deviation of the stock index return is approximately 6.74, which indicates the overall volatility of China's stock market is quite high. Tables J.2, J.3 and J.4 report the means and standard deviations of the independent variables from January 2001 to May 2016. The PRI has a fairly high mean value of 224.0 and the means of EPUC and EPUA are around 131.1 and 120.4, respectively. This implies that uncertainty caused by stock market-related policy in China is greater than the economic policy uncertainty in either China or the US, which is reflected in frequent government intervention in China's stock market.

[52] According to the Dow Theory, both bull and bear markets normally last 1-4 years and the share prices increase or decrease by over 20%.
[53] http://www.policyuncertainty.com/

Before conducting the analysis, the time series used for the regression model is statistically tested to identify the unit root, multicollinearity and lagged terms of the dependent variable.

(1) Unit root test

The stationarity of the dependent and independent variables is crucial for the estimator of OLS to produce unbiased results of the parameter estimate. Based on the ADF test, Table 5.3 shows that the variables of stock market volatility (Vol_t, Vol_t^{upward} and $Vol_t^{downward}$), three explanatory variables in category A (PRI_t, $EPUA_t$ and $EPUC_t$) and one control variable, the interest rate IR_t, are all stationary at level form. Four of the six macroeconomic variables and the two stock market-specific variables are non-stationary at level form, but they are all stationary series after de-trending by first-order differencing. The variable, inflation rate, is stationary at level form under the full sample but has one unit root in both sub-samples divided in terms of the different market conditions of bullish and bearish times.

Table 5.3 The Results of the Unit Root Tests

	Vol_t	Vol_t^{upward}	$Vol_t^{downward}$	PRI_t	$EPUA_t$	$EPUC_t$	IR_t
Full Sample	I (0)	I (0)	I (0)	I (0)	I (0)	I (0)	I (0)
Bull Market	I (0)	I (0)	I (0)	I (0)	I (0)	I (0)	I (0)
Bear Market	I (0)	I (0)	I (0)	I (0)	I (0)	I (0)	I (0)
	INF_t	ER_t	RS_t	IP_t	MS_t	SE_t	SV_t
Full Sample	I (0)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)
Bull Market	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)
Bear Market	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)	I (1)

Notes: The null hypothesis of the ADF test is I (1). I (0) means the time series is stationary at level form and I (1) means the time series is stationary at first-difference form.

Source: Author's calculations

(2) Identification of multicollinearity

Theoretically, the PRI for China's stock market is based on the counts of newspaper articles that are closely related to policy events that occurred randomly, thus it is reasonable to expect that there is no close correlation between the PRI and other explanatory variables. This is confirmed by the results presented in Appendix I.3; the correlation coefficients of the PRI and other explanatory variables are less than 0.23. Therefore, the problem of multicollinearity may possibly be derived from the six macroeconomic variables and the two control variables related to the economic policy uncertainty in the US and China.

Based on the correlation coefficients of the explanatory variables, the results presented in Appendix I.3 suggest that there is no close correlation within the explanatory variables except for the EPUA and EPUC indices. The correlation coefficient of the two indices of economic

policy uncertainty is greater than 0.55 whereas all other coefficients are less than 0.5. To avoid the possible consequences caused by the problem of multicollinearity, the EPUA index is dropped while the regression model equation (5-8) is estimated including the EPUC index, and vice versa.

(3) Granger causality test

To avoid the endogeneity issue, Granger causality test is applied to test whether the PRI and stock market volatility are codetermined. The models are shown by equations (5-10) and (5-11).

$$PRI_t = \alpha_0 + \alpha_1 PRI_{t-1} + ... + \alpha_i PRI_{t-i} + \beta_1 Vol_{t-1} + ... + \beta_i Vol_{t-i} + \varepsilon_t \quad (5-10)$$

$$Vol_t = \alpha_0 + \alpha_1 Vol_{t-1} + ... + \alpha_i Vol_{t-i} + \beta_1 PRI_{t-1} + ... + \beta_i PRI_{t-i} + \varepsilon_t \quad (5-11)$$

The F- statistic 1.049 and P-value 0.3879 suggest that stock market volatility does not Granger cause the PRI, which implies that there is no reversed effect between the PRI and stock market volatility.

(4) Determination of lagged length of the dependent variable

Based on the auto-correlogram and the partial autocorrelation coefficients of the time series of the dependent variable with its own lagged values, the results show that the autocorrelation coefficient is second-order truncated with the full sample and the sub-sample of the bearish time. Thus, the regression models for the full sample and the sample for bear markets are finally defined with two lagged terms of the dependent variable. Comparatively, the partial autocorrelation coefficient is first-order truncated for the other sub-sample of the bull markets. As a result, only one lagged term of the dependent variable is included in the regression model.

For the dependent variable of stock market volatility and the independent variables in category A, logarithmic forms are introduced into the regression model for the analysis.

5.5 Empirical results

The results of the parameter estimates for the PRI are shown in Tables 5.4, 5.5 and 5.6. The detailed results, including all parameter estimates of the explanatory variables in terms of the different market conditions, are presented in Appendix K.

5.5.1 Full sample

The full sample covers January 2001 to May 2016; the regression results for the full sample are provided in Table 5.4 and Appendix Tables K.1, K.2 and K.3. The second row in Table 5.4 displays results from regressing the overall stock market volatility on policy risk indicated by the PRI. The results suggest that policy risk has a significant impact on the volatility of China's stock market. All coefficients of the PRI are statistically significant at 1% level, with a coefficient of around 0.14 indicating that a 1% increase in the PRI is associated with roughly a 0.14% increase in the stock market volatility[54]. To put this in perspective, the increase of 77% in the PRI from June to July, 2015, implies an estimated upward shift of around 11% in stock market volatility measured by the monthly standard deviations of the stock index returns.

Table 5.4 The Effects of Policy Risk on Stock Market Volatility (full sample)

Series / Volatility	(1)	(2)	(3)	(4)	(5)
Overall	**0.1297 (2.72)*** **	**0.1331 (2.77)*** **	**0.1313 (2.71)*** **	**0.1502 (2.98)*** **	**0.1435 (2.89)*** **
Upward	**0.1602 (2.59)** **	**0.1690 (2.71)*** **	**0.1499 (2.39)** **	**0.1831 (2.78)*** **	**0.1679 (2.62)*** **
Downward	0.0956 (1.56)	0.0952 (1.54)	0.1016 (1.63)	0.0949 (1.43)	-

Notes: ***, **, *: 1%, 5% and 10% level of statistical significance, respectively; *t*-test in parentheses.

Source: Author's calculations.

The last two rows in Table 5.4 report the results from regressing the upward and downward volatility on the PRI in China's stock markets. The results support the idea that policy risk has a significant impact on the upward volatility of the stock market but there is an insignificant effect of policy risk on the downward market volatility. Based on the specification of the upward volatility, all coefficients of the PRI are statistically significant at 1% or 5% level; comparatively, the estimated results for the downward volatility are all statistically insignificant. Accordng to the results, the effect of the PRI on upward volatility is statistically and economically greater than on downward volatility (see Table 5.4).

Appendix K provides the results from regressing the stock market volatility on the economic policy uncertainty in the US and China. The values of the estimated parameter EPUA and EPUC indices suggest that economic policy uncertainty has an insignificant impact on the

[54] As shown in Table 5.5, the effect of the PRI on the downward volatility estimated based on the sub-sample of the bull markets is around 0.56 and which is nearly four times greater than that on the overall volatility estimated based on the full sample.

volatility of China's stock market. This implies that China's stock market is barely influenced by changes in the local and global economic environments. Therefore, for China, it is hard to say that the stock market is a barometer of economic development.

Column (4) in the Appendix K tables presents the results regressing the stock market volatility on the six macroeconomic variables and two stock market-specific variables. According to the results in Appendix Tables K.1, K.2 and K.3, three control variables, interest rate, inflation rate and share volume in circulation, have a significant effect on the stock market volatility. The results suggest that inflation rate and share volume in circulation have a positive relationship with stock market volatility and the coefficient of the variable IR supports a negative relationship between the interest rate and stock market volatility in China. This makes sense because a continuous increase in the inflation rate is more likely to raise investors' concerns about a tightening economic policy so causing more uncertainty and volatility in the stock market. Besides, the estimated coefficient shows that the effect of the share volume in circulation on stock market volatility is economically insignificant even though it is statistically significant at the 10% level.

5.5.2 Bull market

Since 2001, bullish times in China's stock market comprise four periods: 2001.01 ~ 2001.06, 2005.07 ~ 2007.10, 2008.11 ~ 2009.08, and 2014.08 ~ 2015.05. For the bull market sub-sample, the regression results are provided in Table 5.5 and Appendix Tables K.4, K.5 and K.6.

Table 5.5 The Effects of Policy Risk on Chinese Stock Market Volatility during Bull Markets

Series / Volatility	(1)	(2)	(3)	(4)	(5)
Overall	**0.2840 (2.36)****	**0.2926 (2.40)****	**0.2860 (2.35)****	**0.2537 (1.89)***	**0.3177 (2.93)*****
Upward	0.1909 (1.42)	0.2029 (1.50)	0.1853 (1.36)	0.1596 (1.05)	0.1172 (0.86)
Downward	**0.5362 (3.33)*****	**0.5383 (3.29)*****	**0.5411 (3.31)*****	**0.6353 (3.35)*****	**0.5730 (3.76)*****

Notes: ***, **, *: 1%, 5% and 10% level of statistical significance, respectively; *t*-test in parentheses.

Source: Author's calculations.

Row (2), Table 5.5, presents the results from regressing stock market volatility in bullish times on the PRI. The estimated coefficient shows a significant impact of the PRI on the overall market volatility during bullish times. A larger value of around 0.3 indicates that a 1% rise of the PRI is connected with a roughly 0.3% increase in stock market volatility in bullish

times; comparatively, the effect of the PRI on the overall volatility in bullish times is nearly twice that in the full sample period. The evidence supports the fact that market participants in bull markets are more sensitive to policy-related risk and/or uncertainty in China's stock market.

Results from regressing both the upward and downward stock market volatility on policy risk in the bullish times are displayed by rows (3) and (4), Table 5.5. By comparing with the insignificant effect of the PRI on the upward volatility, the coefficient of over 0.53 shows that policy risk has a remarkably higher significant influence on the downward volatility in bull markets. Taking the same example to demonstrate the magnitude in perspective, the PRI rose by 77% from June to July in 2015, which implies an estimated downward movement of around 41% in the stock market volatility measured by the monthly standard deviation of stock index returns. This shows that policy risk and/or uncertainty is more likely to cause a sharp drop in bull stock markets, which is consistent with the empirical results of Wang et al. (2012) study.

Similarly, the results in Appendix Tables K.4, K.5 and K.6 suggest that economic policy uncertainty, which is indicated by the proxy indices EPUA and EPUC, has an insignificant effect on the overall volatility of China's stock market regardless of the origin of the economic policy uncertainty. A similar conclusion can be reached for the upward volatility as in bullish times on China's stock market.

Column (4), Appendix Table K.5, reports results from regressing the upward market volatility in bullish times on other control variables. The coefficients of retail sales and industrial production are statistically significant with values of 0.0826 and 0.0476, respectively. This implies that during bull markets any favourable policy news about good economic growth could potentially spark a further upward shift of the stock market. Conversely, the effects of retail sales and industrial production on both overall and downward volatility are insignificant in bull markets, but the significant coefficients of the INF variable in Appendix Tables K.4 and K.6 suggest that inflation rate has a negative impact on the overall and downward volatility of China's stock market.

Initially, according to the theoretical discussion in Section 5.2.1.1, it seems unreasonable that the overall level of consumer prices has a negative relationship with stock market volatility. However, after carefully checking the sub-sample of the bull markets, it is both practically and theoretically plausible because the sample includes two periods, 2001.01 to 2001.06 and

2008.11 to 2009.08, during which China's economy was in deflation[55], and an increase in the CPI in a deflation economy means economic performance is improving, which is helpful in stabilizing volatility in the stock market (Boyd et al., 2001; Liu & Wang, 2004).

5.5.3 Bear market

The bearish time of China's stock markets includes four periods: 2001.07 ~ 2005.06, 2007.11 ~ 2008.10, 2009.09 ~ 2014.07 and 2015.06 ~ 2016.05. The regression results for the sub-sample of bear markets are reported in Table 5.6 and Appendix Tables K.7, K.8, and K.9.

Row (2), Table 5.6, shows the results of overall market volatility on policy risk. The positive coefficient values of the PRI in models (1), (3) and (4) suggest a statistically significant influence of policy risk on the overall volatility at the 5% significance level in bearish markets. The coefficients in models (2) and (5) also present a positive effect of policy risk on overall volatility at the 1% and 10% significance levels, respectively. Compared with the coefficient of the PRI in bullish markets, policy risk has a greater positive impact on the overall market volatility in bullish times than in bearish times. The result demonstrates that the stock investors might be more sensitive to policy-related risk and/or uncertainty in bull markets than in bear markets.

Table 5.6 The Effects of Policy Risk on Chinese Stock Market Volatility during Bear Markets

Series / Volatility	(1)	(2)	(3)	(4)	(5)
Overall	**0.1382 (2.44)****	**0.1495 (2.62)*****	**0.1394 (2.42)****	**0.1457 (2.49)****	**0.0968 (1.78)***
Upward	**0.1742 (2.33)****	**0.1866 (2.48)****	**0.1638 (2.16)****	**0.1861 (2.37)****	**0.1320 (1.79)***
Downward	0.0572 (0.87)	0.0660 (0.99)	0.0621 (0.92)	0.0605 (0.86)	0.0234 (0.36)

Notes: ***, **, *: 1%, 5% and 10% level of statistical significance, respectively; *t*-test in parentheses.

Source: Author's calculations.

The last two rows in Table 5.6 report the results of upward and downward volatility on policy risk, respectively. The PRI coefficients in models (1), (2), (3) and (4) support a significant relationship between policy risk and upward volatility at the 5% significance level in bearish stock markets. Coefficients less than 0.1 suggest that the effect of PRI on downward volatility is both statistically and economically insignificant in bear markets. Furthermore, compared with the impact of PRI in bull markets, the results suggest that policy risk has more influence

[55] China experienced two periods of deflation during the period of 2001-2002 and the year 2009.

on downward volatility in bullish times than in bearish times. However, in terms of upward volatility, the results show that the effect of PRI in bear markets is more significant than in bull markets (see Row (3) in Tables 5.5 and 5.6).

The coefficients of EPUA and EPUC are all insignificant in bear markets. According to the results based on the EPU index in different market conditions, the implication is that the volatility of China's stock market barely reacts to changes in the proxy indices for economic policy uncertainty in both the US and China.

The results of the control variables show that most macroeconomic factors have an insignificant effect on the volatility of China's stock market and the two stock market-specific variables of SE and SV are also insignificant. The exchange rate coefficient exhibits a significant impact on China's stock market volatility in bearish times. This implies that the volatility of China's stock market is significantly sensitive to appreciation of the RMB when the market is bearish (Guo & Zhang, 2014; Liu et al., 2015).

In conclusion, based on the empirical results, the four hypotheses in section 5.2.2 are supported; i.e., the effect of policy risk on China's stock market significantly varies according to market conditions as well as the direction of the stock market volatility. First, policy risk based on the PRI exhibits a significant effect on the overall volatility of China's stock market and the effect of the PRI on upward volatility is greater than on downward volatility. Secondly, the PRI has a significant effect on the volatility in both bull and bear markets, but the effect of the PRI in bull markets is greater than in bear markets. Thirdly, in bull markets, the effect of the PRI on downward volatility is greater than on upward volatility. However, in bear markets, the effect of the PRI on upward volatility is greater than on downward volatility. The reason is that investors with short positions have an abundance of investable funds and wait for good opportunities to invest in bearish times, and favourable policy news is likely to lead to optimistic expectations in investors and thus trigger a remarkable jump in share prices. The empirical results also suggest that economic policy uncertainty indicated by the EPUA and EPUC indices has an insignificant impact on the volatility of China's stock market.

Finally, in terms of the control variables, the results suggest that there is a significant positive relationship between stock market volatility and the inflation rate as well as the share volume in circulation in the full sample; the coefficient IR exhibits a negative relationship between the interest rate and the volatility of China's stock market.

In bull markets, the results suggest that retail sales and industrial production significantly affect the upward volatility of the stock market positively whereas inflation rate has a negative impact on the overall and downward volatility in China's stock market. In bear markets, it is evident that the exchange rate has a significant impact on the stock market and this suggests that the volatility of China's stock market is significantly sensitive to appreciation of the RMB when the market is bearish.

5.6 Summary

In this chapter, we developed four basic hypotheses to test volatility in China's stock market. A multivariate regression model is used to investigate the effects of the PRI on the stock market volatility in China from January 2001 to May 2016. The monthly upside and downside half standard deviations of the stock index returns are calculated to measure the upward and downward stock market volatility, respectively. Next, based on the calculated series, empirical analyses are conducted to differentiate the effects of the PRI between upward and downward volatility.

We divide the sample period into the bull and bear markets, and the empirical results from regressing the stock market volatility on the PRI support the fact that the effects of policy risk on China's stock market are significantly different in terms of the different market conditions and volatility directions. First, policy risk based on the PRI suggests a significant effect on the overall volatility of China's stock market; the effect of the PRI on upward volatility is greater than on downward volatility. Secondly, the PRI has a significant effect on volatility in both bull and bear markets; the effect of the PRI in bull markets is greater than in bear markets. Thirdly, the effect of the PRI on downward volatility is greater than on upward volatility in bull markets. Similarly, the effect of the PRI on upward volatility is greater than on downward volatility in bear markets.

Compared with the positive results for the PRI, the empirical results suggest that economic policy uncertainty based on the EPU indices, EPUA and EPUC, show an insignificant impact on the volatility of China's stock market. In terms of the control variables, under the full sample, the empirical results show a significant, positive relationship between the stock market volatility and inflation rate as well as the volume of circulating shares, whereas the IR coefficient supports a negative relationship between interest rate and market volatility.

In bull markets, the results suggest that retail sales and industrial production significantly positively affect the upward volatility of the stock market whereas inflation rate negatively

impacts the overall and downward volatility in China's stock market. The exchange rate shows a significant impact on the stock markets in the bear markets.

These findings are partly consistent with results in previous related studies. For example, some previous studies, such as Peng and Xiao (2002), Qu et al. (2008), and Xu and Li (2001) claim that regulatory policies significantly impact China's stock market fluctuations. A similar study by Wang et al. (2012) finds that policy factors significantly affect the stock market volatility，including both upward and downward; their results also support the fact that policy factors explain more changes in the stock market volatility in bull markets than in bear markets. However, compared with a reasonably low adjusted-R^2 of 0.4 in this study, Wang et al.'s (2012) regression results record a remarkably higher adjusted-R^2 of 0.8. Considering the different methodologies used in two studies, the higher value for the goodness-of-fit in Wang et al.'s (2012) study might be caused by the method used to quantify the policy factors in China's stock market[56].

A key objective of Baker et al. (2013, 2016) focused on investigating the effect of the EPU index on stock market volatility in the US. Comparatively, the results of the PRI coefficients in this study are very close to the reported coefficients of the EPU index with values around 0.2 in Baker et al. (2013, 2016). Likewise, after including different explanatory variables in the regression equations, the stable outcome of the PRI coefficient produced by the OLS estimators show that the policy risk estimates are consistent and robust to the choices of control variables in this study.

In conclusion, the main findings of this study provide some new evidence to support the idea that China's stock market is a policy-driven stock market, especially under some circumstances, which is consistent with the results in previous studies by Peng and Xiao (2002), Qu et al. (2008), Wang et al. (2012) and Xu and Li (2001),. Moreover, policy risk exhibits a significantly higher impact on downward volatility in bullish times and upward volatility in bearish times, which empirically supports the proposition of the official desirable 'Policy Bottom (政策底)' and 'Policy Top (政策顶)' in China's stock market[57], which are commonly discussed in the literature such as He (2009) and Lu (2013). Although the effect of policy risk on stock market volatility is statistically significant, compared with the potential policy costs, the coefficient of PRI on the overall volatility is only around 0.13 for the full

[56] In Wang et al.'s (2012), the daily standard deviation of the stock index return is used to measure the intensity of policy factors as well as the stock market volatility; this could be the main reason for a higher adjusted-R^2.
[57] In practice, 'Policy Bottom' and 'Policy Top' are not officially confirmed. Both terms appear frequently in the media or articles written by the stock analysts, and are used to define the authorities' acceptable lowest and highest levels of the stock index.

sample. The relatively small value of the PRI coefficient on the overall volatility implies that policy intervention in China's stock market is not as efficient as the regulatory authorities thought it would be in the long term.

Chapter 6
Conclusion

6.1 Introduction

The policy-driven feature of China's stock market induces a debatable argument that government policy plays a dominant role in the market that is supposed to be free of political interference. To identify the dynamic policy-driven effect on China's stock market over time, this study constructs a proxy of the PRI to measure policy risk. Based on the developed PRI, the impact of policy risk on the volatility of China's stock market is investigated; the results support the idea that policy risk has a significant impact on stock market volatility, especially the downward volatility in bullish times and the upward volatility in bearish times.

This chapter summarizes the main findings of this study, followed by limitations of the study. Besides, several possible improvements which could be made in future research are proposed. Section 6.2 briefly concludes the major findings of this study. Section 6.3 discusses the policy implications of the empirical results, followed by the limitations of the study in Section 6.4. Some potential directions or extensions for future research are proposed in Section 6.5.

6.2 Major findings of the study

6.2.1 Construction of the PRI

One of the main research objectives of this study is to develop a new proxy index to measure the policy risk in China's stock market. To achieve this objective, the effects of different policy events on the stock market volatility are explored to ascertain the policy categories required to develop the PRI. The empirical results show that policy-related risk and/or uncertainty in China's stock market is mainly caused by four types of policy events that are closely related to government intervention: official comments, regulatory activities, market expectations, and market rumours about future changes in stock market-related policies. There is consistent correspondence between the frequency of policy risk-related news reports and the underlying market risk and/or uncertainty caused by government policies in China's stock market.

Based on the frequency of news articles published in five sampled official newspapers, the PRI is developed to measure the policy risk and/or uncertainty in China's stock market. The continuity of publication and news columns assures good consistency in the selected

newspapers and the official background of the selected newspapers makes policy-related articles free of political slant; a human reading complete audit enables us to obtain accurate counts for the PRI construction. The reliability of the PRI is discussed based on correlation analysis and a regression model. The results provide solid evidence to demonstrate that the final audited article counts help produce useful information relating to policy risk in China's stock market so are suitable for PRI computation in this study.

The calculated PRI shows that spikes in the policy risk index perfectly correspond to several important policy events, such as the reduction of state-owned shares, reform of the non-tradable shares, changes in the transaction stamp tax, release of the 'Guojiutiao (国九条)' news and the stock market bailout in July 2015. Based on a comparison with the EPU-China index, the results show that the sample newspapers used in this study are more reliable than the SCMP newspaper used in developing the EPU-China index. PRI differs from the EPU-China index that is mainly applied to economic policy uncertainty related to overall economy; the PRI offers a good proxy index to measure the policy risk in China's stock market.

6.2.2 The effects of policy risk on China's stock market volatility

To achieve the research objectives on the policy-driven effects, four hypotheses are proposed and multivariate regression models are used to investigate the effects of the PRI on stock market volatility in China from January 2001 to May 2016. First, the monthly upside and downside half standard deviations of the stock index returns are calculated to measure the upward and downward stock market volatility, respectively. Second, based on the calculated series, empirical analyses are conducted to differentiate the effects of the PRI between upward and downward volatility. Next, by dividing the sample period into bullish and bearish times, the effects of policy risk on China's stock market are further explored in terms of different market conditions as well as volatility directions.

The empirical results show that policy risk specified by the PRI has a significant effect on the overall volatility of China's stock market and the effect of PRI on upward volatility is greater than on downward volatility. In the different market conditions, the PRI has a significant effect on the volatility in both bull and bear markets; the effect of the PRI in a bull market is greater than in a bear market. Moreover, the effect of the PRI on downward volatility in a bull market is greater than on upward volatility; however, the effect of the PRI on upward volatility in a bear market is greater than on the downward volatility.

The study results also suggest that economic policy uncertainty indicated by EPUA and EPUC has an insignificant impact on the volatility of China's stock market. For the six control variables, under the full sample, the empirical results show a significant positive relationship between stock market volatility and inflation rate and between volatility and the volume of circulating shares whereas the interest rate has a negative impact on the stock market volatility. In terms of the bull market, the empirical results suggest that retail sales and industrial production have a significant positive effect on the upward volatility of the stock market whereas inflation rate negatively impacts the overall and downward volatility in China's stock market. In a bear market, it is evident that the exchange rate has a significant impact on stock market volatility.

In conclusion, the main findings of this study provide new evidence to support the idea that China's stock market is a policy-driven market, especially under some circumstances. This is consistent with the results of previous studies. Moreover, policy risk exhibits a significantly higher impact on downward volatility in bullish times and upward volatility in bearish times, which empirically supports the proposition of the official desirable 'Policy Bottom' and 'Policy Top' in China's stock market according to discussion in the literature. However, compared with the potential costs caused by policy risk or/and uncertainty, the relatively small value of the PRI coefficient on the overall volatility implies that policy intervention in China's stock market is not as efficient as the regulatory authorities thought it should be in the long term.

6.3 Policy implications of the study

In the short term, direct policy intervention of the regulatory authority can impose a significant impact on the stock market though it is an undesirable situation, but it barely affects the trend of the stock market in the long term. As a result, it is very important for the regulators of China's stock market to play the central role of the watchdog of the market regulations rather than as an omnipotent market controller. In this sense, the findings of this study provide five important policy implications to improve the efficiency of regulatory policies from the perspective of risk management.

First, the regulatory authority of China's stock market,CSRC, should avoid direct policy intervention because it has no responsibility for stabilizing the volatility of the stock prices[58].

[58] According to the introduction of the CSRC on the official website, the CSRC maintains an orderly securities and futures market and ensures the legal operation of the capital market. Moreover, it is clear that stabilizing stock prices is not included in the duties the CSRC performs in the supervision and administration of the securities market.
Source: http://www.csrc.gov.cn/pub/csrc_en/about/intro/200811/t20081130_67718.html

Considering that the effectiveness of policy interference has always been overestimated in controlling the trend of stock markets in the long run, it is undoubtedly necessary that regulators need to take every effort to end direct market interference and reduce market uncertainty. Furthermore, according to the study's findings, active market intervention by government, without exception, causes massive volatility in the stock market. As a result, the source of policy risk will continue to exist if regulatory authorities keep intervening in stock trading in China's stock market. Therefore, concentrating on its duties in terms of market supervision and administration rather than controlling the share prices is the first priority concern for securities regulators.

Second, regulators need to be extremely cautious when making any subjective comments about the current valuation of the stock market. It is considered irresponsible to make an official comment such as '4000 of SHCI is only a start point of the bull market'[59] because market participants assume it as a signal of a forthcoming 'policy-driven bull market' promoted by central government. In China, the impact of casual comments from government officials may be amplified by market rumours thus, unexpectedly, result in abnormal market volatility (Yang et al., 2016). As a result, under all circumstances, an objective, neutral attitude of government comments is recommended; that will help stabilize fluctuations of the stock market.

Third, it is crucial for authorities to improve the transparency of regulatory activities in the stock markets. Ambiguous policy attitudes, comments and implementation always prove to be a major source of uncertainty in China's stock market (Wang et al., 2012; Yang et al., 2016). By making use of any information advantage, institutional investors with close connections to the policymakers could benefit by harming the interests of retail investors. Consequently, it is common to see that most retail investors intend to make extra profit by making every effort to obtain the inside policy information instead of focusing on the fundamentals of the listed companies; speculative investments are believed to be another reason for the frequent stock market volatility in China (He, 2004; Qu et al., 2008). For this reason, high transparency of the regulatory policies and activities are vital to reduce the market risk and/or uncertainty caused by policy and to further help smooth fluctuations of securities' prices.

Fourth, it is essential for the policymakers to change the path-dependence feature of the stock investors and terminate the reverse pressure transmission from market participants to regulatory authorities. In practice, for considerations of social stability and even political

[59] This comment was originally from the news article published on the official website of *People's Daily*. http://www.people.com.cn

concerns, central government has to be involved in daily stock trading to avoid being severely blamed for the failure of stock market supervision and administration. This is another deep-rooted reason for China's policy-driven stock market; potential official endorsement of the stock market tends to encourage more highly speculative investment in the stock market (He, 2004; Lu & Xu, 2004). The termination of investors' path-dependence on policy driving can help lessen the influence of market rumours on stock market volatility if it is realized by investors that the only thing concerning the regulators is to maintain a fair and transparent market environment rather than to concentrate on the stock index movements.

Additionally, it is suggested that the regulators need to keep improving the quality of listed companies by expanding the reforms of the regulatory system to improve stock market supervision and regulations, such as introducing a registration-based IPO system and forcibly implementing the delisting policy. It is also believed that an orderly stock market with many high-quality listed companies helps make the stock market more attractive to value investors instead of pure speculators (Xiang & Wang, 2004). In China, the verification system for securities offering is commonly blamed for rent-seeking by officials and low-quality companies that acquire listed qualifications by bribery and financial fraud (Yang et al., 2016). As a result, listed companies prefer to produce new concepts for more financing instead of creating greater value to attract more investors. It is reasonable for stock investors to try to figure out the underlying purpose of government policies rather than pay too much attention to choosing valuable investment objectives (Wang & Ye, 2011). Therefore, in the long term, institutional reform is one of the most important ways for the regulators to stabilize stock market volatility in China.

In conclusion, according to the results of this study, it is proposed that the regulatory authorities need to take a combination of measures to prevent the stock market from being negatively influenced by policy-related risk and/or uncertainty.

6.4 Limitations of the study

In this study, a new PRI is developed to measure the policy risk in China's stock market; then, based on the PRI, an empirical investigation is conducted to test the effect of policy risk on stock market volatility in China. The construction of the PRI is a meaningful academic exploration and the results of this study show that the PRI is a good proxy index for measuring policy risk. The empirical investigation based on the PRI provides some new evidence to support the idea that policy-driving is one of the major causes of volatility in

China's stock market. However, there are also several limitations that should be addressed in future research.

First, the approach used to measure policy risk in this study is based on counts of relevant news articles in selected official newspapers. As a result, the developed PRI cannot capture the detailed policy information in the articles. In terms of different authors, newspapers, article content, policy attitudes and categories of government policy, every article might have different effects on stock market volatility, but our PRI cannot reflect all those different effects because the selected articles are treated equally in the construction of the index.

Second, theoretically, daily data could be more useful to accurately capture the effect of policy risk on stock market volatility. The PRI developed in this study is capable of providing only monthly information of policy risk in China's stock market. Further, the PRI covers a sample period from only January 2001 to May 2016 because of the unavailability of news articles in *CCNFD*; as a result, this study provides no corresponding index information to capture the policy risk in China's stock market between 1990 and 2000.

Third, the developed PRI cannot distinguish any risk and/or uncertainty from any one specific type of the government policy such as monetary policy, fiscal policy, and regulatory policy. In this study, the PRI is constructed as an overall proxy for policy-related risk and all stock market-related policies are treated equally in computing the final index. As a result, it is unlikely that the PRI provides useful information to investigate the effects of different government policies on stock market volatility in China.

This study focuses only on identifying the impact of policy risk on stock market volatility; no further investigation is conducted to explore the effects of policy risk on fluctuations in stock trading volume or the financial performance of listed companies in China's stock market. Only the Shanghai Composite Index and A-share are considered in this study; it is unknown whether the research outcomes are applicable to SMEB (Small and Medium-size Enterprise Board) or GEB (Growth Enterprise Board) on the Shenzhen Stock Exchange.

Finally, although the results in this study suggest that policy risk has a significant impact on the volatility in China's stock market, it remains unresolved how the abnormal volatility of stock market affects the policy-making of the regulatory authorities in China. As discussed in Section 6.3, under some circumstances, market participants impose pressure on the regulatory authorities and force them to intervene in the operation of the stock market; so it is necessary to explore the effect of stock market volatility on the behaviour of Chinese regulators.

6.5 Future research

In terms of the methodology used to measure the policy risk in China's stock market, this study contributes to the development of a new PRI based on the frequency of news reports in a selected sample of official newspapers. Future research could improve the method and update the PRI, e.g., use more media sources, such as online blog articles and comments in private media, to construct the PRI. Apart from counts of news articles, more detailed information about the articles, such as attitudes towards the policy comments, ways of expressing, and headlines, could be included in the PRI.

As discussed in Section 6.4, it might be more meaningful and useful for researchers to further investigate the daily impact of government policies on the stock market volatility if the PRI can provide daily information on the policy risk in China's stock market. To achieve this goal, a bigger sample of news sources might be needed to collect enough relevant articles to construct a daily PRI. Future research could also extend this study's findings by developing sub-indices to measure the risk and/or uncertainty caused by one specific type of government policy.

Additionally, future research could extend this study to empirically identify the effect of policy risk on the financial performance of listed companies as well as changes in the trading volume on China's stock market. It is meaningful to explore the impact of abnormal stock market volatility on policy-making by the regulatory authorities and the results could provide a deeper understanding and more insights into stock market regulators in China.

Finally, the methodology could be applied to develop similar indices to measure the policy risk and/or uncertainty in other developing stock markets, such as Vietnam or other countries in South-East Asia. Future research could extend this study to empirically investigate the effect of the policy risk on the stock market volatility in other underdeveloped countries.

References

Ackert, L. F., Hao, J., & Hunter, W. C. (1997). The effect of circuit breakers on expected volatility: Tests using implied volatilities. *Atlantic Economic Journal, 25*(2), 117-127.

Alexopoulos, M., & Cohen, J. (2009). Uncertain times, uncertain measures. *Working Paper, Department of Economics, University of Toronto*, No. 352.

Allen, F., Qian, J., & Qian, M. (2005). Law, finance, and economic growth in China. *Journal of Financial Economics, 77*(1), 57-116.

Anshuman, V. R. (2003). Regulatory measures to curb stock price volatility. *Economic and Political Weekly*, 677-679.

Apergis, N. (2015). Policy risks, technological risks and stock returns: New evidence from the US stock market. *Economic Modelling, 51*, 359.

Aven, T., & Renn, O. (2009). On risk defined as an event where the outcome is uncertain. *Journal of Risk Research, 12*(1), 1-11.

Bachmann, R., Elstner, S., & Sims, E. T. (2013). Uncertainty and the economic activity: evidence from business survey data. *American Economic Journal: Macroeconomics, 5*(2), 217-249.

Baker, R. S., Bloom, N., Davis, J. S., & Rodden, J. (2013). Measuring Economic Policy Uncertainty. Working paper. University of Chicago.

Baker, R. S., Bloom, N., & Davis, J. S., & Rodden, J. (2016). Measuring Economic Policy Uncertainty[J]. *The Quarterly Journal of Economics*, 131(4):1593-1636.

Baker, R. S., Bloom, N., Davis, J. S., & Rodden, J. (2014). Why Has US Policy Uncertainty Risen Since 1960? *American Economic Review: Papers & Proceedings, 104*(5), 56-60.

Baltagi, B. H., Li, D., & Li, Q. (2006). Transaction tax and stock market behavior: evidence from an emerging market. *Empirical Economics, 31*(2), 393-408.

Barnea, A., & Brenner, M. (1974). The effects of world events on stock market variables. *Financial Analysts Journal, 30*(4), 64-66.

Bekaert, G., Hoerova, M., & Duca, M. L. (2013). Risk, uncertainty and monetary policy. *Journal of Monetary Economics, 60*(7), 771-788.

Bekhet, H. A., & bt Othman, N. S. (2012). Examining the role of fiscal policy in Malaysian stock market. *International Business Research, 5*(12), 59.

Bell, S., & Quiggin, J. (2006). Asset price instability and policy responses: The legacy of liberalization. *Journal of Economic Issues, 40*(3), 629-649.

Berkman, H., & Lee, J. B. T. (2002). The effectiveness of price limits in an emerging market:

Evidence from the Korean Stock Exchange. *Pacific-Basin Finance Journal, 10*(5), 517-530.

Bittlingmayer, G. (1998). Output, stock volatility, and political uncertainty in a natural experiment: Germany, 1880-1940. *Journal of Finance*, 2243-2257.

Bommel, J. V. (2003). Rumors. *The Journal of Finance, 58*(4), 1499-1520.

Bonner, S. E., Hugon, A., & Walther, B. R. (2007). Investor reaction to celebrity analysts: The case of earnings forecast revisions. *Journal of Accounting Research, 45*(3), 481-513.

Bontempi, M. E., Golinelli, R., & Squadrani, M. (2016). A new index of uncertainty based on internet searches: a friend or foe of other indicators? *Working Paper DSE*, No.1062.

Born, B., & Pfeifer, J. (2014). Policy risk and the business cycle. *Journal of Monetary Economics, 68*, 68-85.

Boyd, J. H., Hu, J., & Jagannathan, R. (2005). The stock market's reaction to unemployment news: Why bad news is usually good for stocks. *The Journal of Finance, 60*(2), 649-672.

Boyd, J. H., Levine, R., & Smith, B. D. (2001). The impact of inflation on financial sector performance. *Journal of Monetary Economics, 47*(2), 221-248.

Brockman, P., & Chung, D. Y. (2003). Investor protection and firm liquidity. *The Journal of Finance, 58*(2), 921-938.

Brogaard, J., & Detzel, A. (2015). The asset-pricing implications of government economic policy uncertainty. *Management Science, 61*(1), 3-18.

Brumm, J., Grill, M., Kubler, F., & Schmedders, K. (2015). Margin regulation and volatility. *Journal of Monetary Economics, 75*, 54-68.

Campbell, J. Y., & Ammer, J. (1993). What moves the stock and bond markets? A variance decomposition for long‐term asset returns. *The Journal of Finance, 48*(1), 3-37.

Campbell, J. Y., & Shiller, R. J. (1988). Stock prices, earnings, and expected dividends. *The Journal of Finance, 43*(3), 661-676.

Chan, L. K., Hamao, Y., & Lakonishok, J. (1991). Fundamentals and stock returns in Japan. *The Journal of Finance, 46*(5), 1739-1764.

Chan, W. S. (2003). Stock price reaction to news and no-news: drift and reversal after headlines. *Journal of Financial Economics, 70*(2), 223-260.

Chatziantoniou, I., Duffy, D., & Filis, G. (2013). Stock market response to monetary and fiscal policy shocks: Multi-country evidence. *Economic Modelling, 30*, 754-769.

Chen, D. (2002). Research on china's policy stock market. *Social Science Journal For Central South Uiversity of Technology*(4), 350-354. (in Chinese)

Chen, G.-M., Kim, K. A., & Rui, O. M. (2005). A note on price limit performance: The case

of illiquid stocks. *Pacific-Basin Finance Journal, 13*(1), 81-92.

Chen, G., Zhang, R., & Yao, L. (2014). The volatility spillover effect between the stock market and the economic policy uncertainty. *Journal of Finance and Economics*(5), 70-78. (in Chinese)

Chen, H. Q., & Fan, Y. F. (2015). The impact of the launch of margin trading and short selling on Chinese stock market volatility: Evidence from a panel-data policy evaluation approach. *Journal of Financial Research*(6), 159-172. (in Chinese)

Chen, J., Jiang, F., & Tong, G. (2017). Economic policy uncertainty in China and stock market expected returns, SSRN: https://ssrn.com/abstract=2808862.

Chen, N.-F., Roll, R., & Ross, S. A. (1986). Economic forces and the stock market. *Journal of business*, 383-403.

Chen, Q. a., Zhang, Y., & Liu, X. (2010). Empirical study on macroecnomic enviroment, government policy and volatility of stock market in China. *Economist*(2), 90-98. (in Chinese)

Cui, P., & Yi, X. R. (2016). Causes and suggestions of abnormal stock market volatility in China in 2015. *Theory Journal, 265*(3), 81-86.

Cutler, D. M., Poterba, J. M., & Summers, L. H. (1989). What moves stock prices? *The Journal of Portfolio Management, 15*(3), 4-12.

Darrat, A. F. (1988). On fiscal policy and the stock market. *Journal of Money, Credit and Banking, 20*(3), 353-363.

Davies, P. L., & Canes, M. (1978). Stock prices and the publication of second-hand information. *Journal of Business*, 43-56.

Diao, S. C., Cheng, K., & Yang, X. G. (2011). Empirical estimation for capital flow into stock and real estate markets from monetary and credit accounts. *Systems Engineering-Theory & Practice, 31*(4), 617-630. (in Chinese)

Donadelli, M. (2015). Asian stock markets, US economic policy uncertainty and US macro-shocks. *New Zealand Economic Papers, 49*(2), 103.

Donadelli, M., & Persha, L. (2014). Understanding emerging market equity risk premia: Industries, governance and macroeconomic policy uncertainty. *Research in International Business and Finance, 30*, 284-309.

Dougal, C., Engelberg, J., Garcia, D., & Parsons, C. A. (2012). Journalists and the stock market. *Review of Financial Studies*, hhr133.

Durham, J. B. (2003). Monetary policy and stock price returns. *Financial Analysts Journal, 59*(4), 26-35.

Engelberg, J. E., & Parsons, C. A. (2011). The causal impact of media in financial markets.

The Journal of Finance, 66(1), 67-97.

Fair, R. C. (2002). Events that shook the market. *The Journal of Business, 75*(4), 713-731.

Fama, E. F. (1965). The behavior of stock-market prices. *Journal of Business*, 34-105.

Fama, E. F. (1970). Efficient capital markets: A review of theory and empirical work. *The Journal of Finance, 25*(2), 383-417.

Fang, L., & Peress, J. (2009). Media coverage and the cross -section of stock returns. *The Journal of Finance, 64*(5), 2023-2052.

Ferris, S. P., & Chance, D. M. (1988). Margin requirements and stock market volatility. *Economics Letters, 28*(3), 251-254.

Green, C. J., Maggioni, P., & Murinde, V. (2000). Regulatory lessons for emerging stock markets from a century of evidence on transactions costs and share price volatility in the London Stock Exchange. *Journal of Banking & Finance, 24*(4), 577-601.

Greenwald, B. C., & Stein, J. C. (1991). Transactional risk, market crashes, and the role of circuit breakers. *Journal of Business*, 443-462.

Griffin, J. M., Hirschey, N. H., & Kelly, P. J. (2011). How important is the financial media in global markets? *Review of Financial Studies*, hhr099.

Guo, K., & Zhang, X. M. (2014). Exchange rate expectation and stock price volatility in China. *Studies of International Finance*(8), 88-96. (in Chinese)

Hamilton, J. D., & Lin, G. (1996). Stock market volatility and the business cycle. *Journal of Applied Econometrics, 5*(11), 573-593.

Hamilton, J. T. (1995). Pollution as news: media and stock market reactions to the toxics release inventory data. *Journal of Environmental Economics and Management, 28*(1), 98-113.

Han, D. Z., & Wu, W. B. (2003). Is China 's stock market the barometer of the economic development? . *Quantitative & Technical Economics, 20*(5), 59-62. (in Chinese)

Han, L., & Tang, Y. (2002). Analysis and countermeasures of the root causes of the policy stock market in China. *Science, Economy and Society, 20*(4), 36-39. (in Chinese)

Hancock, D. G. (1989). Fiscal policy, monetary policy and the efficiency of the stock market. *Economics Letters, 31*(1), 65-69.

Hardouvelis, G. A. (1990). Margin requirements, volatility, and the transitory component of stock prices. *The American Economic Review*, 736-762.

Hardouvelis, G. A., & Theodossiou, P. (2002). The asymmetric relation between initial margin requirements and stock market volatility across bull and bear markets. *Review of Financial Studies, 15*(5), 1525-1559.

He, D. X., Rao, M., & Qiao, H. (2013). Research on risks and security hazards of China's

stock market. *Shanghai Finance*(3), 3-10. (in Chinese)

He, Q. (2004). Relations between stock market cycle and policy cycle in china's policy-driven stock market. *Journal of Tianjin Administration Institute, 25*(1), 50-54. (in Chinese)

He, X. N. (2009). Comments on the policy-driven stock markets in China. *International Economics and Trade Research* (4), 52-57. (in Chinese)

Heilmann, S. (2002). The Chinese stock market: pitfalls of a policy-driven market. *China analysis*(15). doi:http://www.chinapolitik.de/studien/china_analysis/no_15.pdf

Holburn, G. L., & Zelner, B. A. (2010). Political capabilities, policy risk, and international investment strategy: Evidence from the global electric power generation industry. *Strategic Management Journal, 31*(12), 1290-1315.

Hosseini, S. M., Ahmad, Z., & Lai, Y. W. (2011). The role of macroeconomic variables on stock market index in China and India. *International Journal of Economics and Finance, 3*(6), 233-238.

Hsieh, D. A., & Miller, M. H. (1990). Margin regulation and stock market volatility. *The Journal of Finance, 45*(1), 3-29.

Hsing, Y. (2013). Effects of fiscal policy and monetary policy on the stock market in Poland. *Economies, 1*(3), 19-25.

Hsu, Y. (1996). Margin requirements and stock market volatility another look at the case of Taiwan. *Pacific-Basin Finance Journal, 4*(4), 409-419.

Hu, C., & Chi, Y. (2013). Investor sentiment, asset valuation, and the volatility of stock market. *Journal of Financial Research*(10), 181-193. (in Chinese)

Hu, J. (2003). Empirical study on the effects of policy on china's stock market. *Economics Information, 8*(6), 22-24. (in Chinese)

Hu, S.-y. (1998). The effects of the stock transaction tax on the stock market–Experiences from Asian markets. *Pacific-Basin Finance Journal, 6*(3), 347-364.

Hu, Z. l. (2015). China's stock market is always a policy-driven market. *Phoenix Finance*. doi:http://finance.ifeng.com/a/20150328/13590810_0.shtml

Jain, P. C. (1988). Response of hourly stock prices and trading volume to economic news. *Journal of Business, 61*(2), 219-231.

Jansen, D. W., Li, Q., Wang, Z., & Yang, J. (2008). Fiscal policy and asset markets: A semiparametric analysis. *Journal of Econometrics, 147*(1), 141-150.

Jiang, Z., & Xie, C. (2007). Mechanism and countermeasures of Chinese policy stock market. *Seeker*(8), 9-11.

Jin, X., Zhu, Y., & Yang, X. (2013). Effects of online media on stock market: An empirical study on eastmoney.com. *Journalism & Communication, 6*(12), 36-51.

Jin, X., Zhu, Y., & Yang, X. (2014). Macroeconomic consequences of policy uncertainty. *Economic Theory and Economic Management, 12*(2), 17-25

Karnizova, L., & Li, J. (2014). Economic policy uncertainty, financial markets and probability of US recessions. *Economics Letters, 125*, 261-265.

Kim, K. A., & Limpaphayom, P. (2000). Characteristics of stocks that frequently hit price limits: Empirical evidence from Taiwan and Thailand. *Journal of Financial Markets, 3*(3), 315-332.

Kim, K. A., & Rhee, S. (1997). Price limit performance: evidence from the Tokyo Stock Exchange. *The Journal of Finance, 52*(2), 885-901.

Kiymaz, H. (2001). The effects of stock market rumors on stock prices: evidence from an emerging market. *Journal of Multinational Financial Management, 11*(1), 105-115.

La Porta, R., López de Silanes, F., Shleifer, A., & Vishny, R. (1998). Law and Finance. *Journal of Political Economy, 106*, 1113-1155.

Laopodis, N. T. (2009). Fiscal policy and stock market efficiency: Evidence for the United States. *The Quarterly Review of Economics and Finance, 49*(2), 633-650.

Lauterbach, B., & BEN‐ZION, U. (1993). Stock market crashes and the performance of circuit breakers: Empirical evidence. *The Journal of Finance, 48*(5), 1909-1925.

Lee, S. B., & Yoo, T. Y. (1993). Margin regulation and stock market volatility: further evidence from Japan, Korea and Taiwan. *Pacific-Basin Finance Journal, 1*(2), 155-174.

Li, Y. F., & Min, Y. Y. (2015). Central bank information communication, limited attention, and the behavior of investors. *Macroeconomics 30*(10), 129-138.

Li, X. M. (2017). New evidence on economic policy uncertainty and equity premium. *Pacfic-Basin Finance Journal*, 46(12), 41-56.

Lin, A. Y. (2006). Has the Asian crisis changed the role of foreign investors in emerging equity markets: Taiwan's experience. *International Review of Economics & Finance, 15*(3), 364-382.

Liu, A. (2005). China's policy stock market: Causes and suggestions. *Journal of Guangdong Vocational College of Finance and Economics*(3), 48-50. (in Chinese)

Liu, B. G. (2012). A research into the environmental adaptability of media supervised by CPC in the context of new media. *Journal of Shanxi University (Philosophy and Social Science Edition) 34*(4), 139-144. (in Chinese)

Liu, J. Q., & Wang, F. Y. (2004). A positive analysis of the dynamic relationship between stock returns and inflation. *The Study of Economics and Finance, 30*(1), 123-128.

Liu, L., Meng, Y., & Yang, K. (2015). Structural change, exchange rate and stock prices in

China: theoretical explanation and empirical analysis. *Studies of International Finance, 39*(5), 3-14. (in Chinese)

Liu, L., & Zhang, T. (2015). Economic policy uncertainty and stock market volatility. *Finance Research Letters, 15*, 99-105.

Lu, R., & Xu, L. B. (2004). Asymmetric effects of policy information on China's stock markets. *China Economic Quarterly, 3*(1), 319-330. (in Chinese)

Lu, W. (2013). An empirical research on structural factors affecting stock price volatility. *Shanghai Economic Review, 33*(12), 95-106. (in Chinese)

Lv, J., & Zhao, Z. (2000). Effect of price limits on stock market volatility. *Jilin University Journal (Social Sciences Edition) 46*(5), 15-19. (in Chinese)

Mannaro, K., Marchesi, M., & Setzu, A. (2008). Using an artificial financial market for assessing the impact of Tobin-like transaction taxes. *Journal of Economic Behavior & Organization, 67*(2), 445-462.

Markowitz, H. M. (1959). *Portfolio Selection.* Cowles Foundation Monograph No. 16. John Wiley, New York.

McQueen, G., & Roley, V. V. (1993). Stock prices, news, and business conditions. *Review of Financial Studies, 6*(3), 683-707.

Meng, C. X. (2011). Study on the risk preference of stock investors. *Reform of Economic System, 56*(1), 174-179. (in Chinese)

Mitchell, M. L., & Mulherin, J. H. (1994). The impact of public information on the stock market. *Journal of Finance and Economics, 49*(3), 923-950.

Morelli, D. (2002). The relationship between conditional stock market volatility and conditional macroeconomic volatility: Empirical evidence based on UK data. *International Review of Financial Analysis, 1*(11), 101-110.

Nave, J. M., & Ruiz, J. (2015). Risk aversion and monetary policy in a global context. *Journal of Financial Stability, 20*, 14-35.

Niederhoffer, V. (1971). The analysis of world events and stock prices. *Journal of Business, 44*(2), 193-219.

Olds, C. (2015). The negative effect of economic policy uncertainty on presidential rhetorical optimism about the economy in the United States. *Economics, Management, and Financial Markets, 10*(2), 54-76.

Omran, M., & Pointon, J. (2001). Does the inflation rate affect the performance of the stock market? The case of Egypt. *Emerging Markets Review, 2*(3), 263-279.

Pastor, L., & Veronesi, P. (2012). Uncertainty about government policy and stock prices. *The Journal of Finance, 67*(4), 1219-1264.

Pearce, D. K., & Roley, V. V. (1985). Stock prices and economic news. *National Bureau of Economic Research*, No. 1296.

Peng, W., & Xiao, J. (2002). Policy and stock market volatility. *Economic Management, 38*(2), 43-49. (in Chinese)

Pound, J., & Zeckhauser, R. (1990). Clearly heard on the street: The effect of takeover rumors on stock prices. *Journal of Business*, 291-308.

Qiao, G., & Zhan, Y. (2002). Game analysis of the behaviors of investors and government in China's stock market. *Study of Finance and Economics, 28*(12), 19-23. (in Chinese)

Qu, W., Xu, N., Guang, J., & Wu, S. (2008). Marketization, government intervention and stock liquidity premium distribution. *Economic Research Journal, 53*(4), 132-146.

Ren, Y., Xiong, C., & Yuan, Y. (2012). House price bubbles in China. *China Economic Review*, 23(4), 786-800.

Rigobon, R., & Sack, B. (2003). Measuring the reaction of monetary policy to the stock market. *The Quarterly Journal of Economics, 118*(2), 639-669.

Rose, A. M. (1951). Rumor in the stock market. *Public Opinion Quarterly, 15*(3), 461-486.

Schumaker, R. P., & Chen, H. (2009). Textual analysis of stock market prediction using breaking financial news: The AZF in text system. *ACM Transactions on Information Systems (TOIS) 27*(2), 12.

Schwert, G. W. (1981). The adjustment of stock prices to information about inflation. *Journal of Finance, 36*(1), 15-29.

Schwert, G. W. (1990). Stock market volatility. *Financial Analysts Journal, 46*(3), 23-34.

Shi, D. (2002). The effect of policy on stock market *Management World, 17*(8), 11-16. (in Chinese)

Solomon, D. H. (2012). Selective publicity and stock prices. *The Journal of Finance, 67*(2), 599-638.

Song, F. T., & Wu, Y. (2010). An empirical test of government act influence on the stock market in China *Journal of East China University of Science and Technology (Social Science Edition), 26*(1), 37-45. (in Chinese)

Song, H., Liu, X., & Romilly, P. (1998). Stock returns and volatility: An empirical study of Chinese stock markets. *International Review of Applied Economics, 12*(1), 129-139.

Su, Y., & Zheng, L. (2011). The impact of securities transaction taxes on the Chinese stock market. *Emerging Markets Finance and Trade, 47*(sup1), 32-46.

Subrahmanyam, A. (1994). Circuit breakers and market volatility: A theoretical perspective. *The Journal of Finance, 49*(1), 237-254.

Subrahmanyam, A. (2013). Algorithmic trading, the Flash Crash, and coordinated circuit

breakers. *Borsa Istanbul Review, 13*(3), 4-9.

Sum, V. (2012). The effect of economic policy uncertainty in the US on the stock market performance in Canada and Mexico. *International Journal of Economics and Finance, 4*(11), 165-171.

Sum, V. (2013). Economic policy uncertainty in the United States and Europe: A cointegration test. *International Journal of Economics and Finance, 5*(2), 98-101.

Sun, H., & Ma, Y. (2003). Monetary policy and stock market in China. *Economic Research Journa, 48*(7), 44-53. (in Chinese)

Tan, L., Chiang, T. C., Mason, J. R., & Nelling, E. (2008). Herding behavior in Chinese stock markets: An examination of A and B shares. *Pacific-Basin Finance Journal*, 16(1-2), 61-77.

Tetlock, P. C. (2007). Giving content to investor sentiment: The role of media in the stock market. *The Journal of Finance, 62*(3), 1139-1168.

Tetlock, P. C. (2010). Does public financial news resolve asymmetric information? *Review of Financial Studies, 23*(9), 3520-3557.

Thorbecke, W. (2001). Monetary policy, time-varying risk, and the bond market debacle of 1994. *Journal of Macroeconomics, 22*(1), 159-174.

Tobin, J. (1969). A general equilibrium approach to monetary theory. *Journal of Money, Credit and Banking, 1*(1), 15-29.

Umlauf, S. R. (1993). Transaction taxes and the behavior of the Swedish stock market. *Journal of Financial Economics, 33*(2), 227-240.

Wang, K. (2002). Policy inducement and intrinsic instability in China's securities market *Economic Research Journal, 47*(12), 25-32. (in Chinese)

Wang, M., Lu, L., & Song, K. (2012). Impacts of policy factors on volatility of stock markets *Journal of Management Sciences in China, 15*(12), 40-57. (in Chinese)

Wang, M., & Sun, J. (2004). Stock Market Returns, Volatility and the Role of Investor Sentiment in China. *Economic Research Journal, 49*(10), 75-83. (in Chinese)

Wang, X., & Ye, M. (2011). A theoretical explanation of the phenomenon of "policy market" in China's stock market. *Academic Research, 39*(1), 81-90. (in Chinese)

Werner, A., & Murray, Z. F. (2004). Is all that talk just noise? The information content of internet stock message boards. *The Journal of Finance, 59*(3), 1259-1294.

Westerhoff, F. (2003). Speculative markets and the effectiveness of price limits. *Journal of Economic Dynamics and Control, 28*(3), 493-508.

Wright, F. J. (1976). Monetary policy and the stock-market - is there a direct link? *Financial Analysts Journal, 32*(3), 27.

Wu, X. W., & Wu, W. B. (2014). The impacts of market, size and leverage on the volatility of China's stock market. *Journal of Central University of Finance & Economics*(9), 41-50. (in Chinese)

Xiang, S., & Wang, F. (2004). Characteristics and causes of China' policy stock market. *Contemporary Finance & Economics, 43*(3), 55-58. (in Chinese)

Xiao, X. F. (2003). Analysis of the behaviors of policy stock market in China *China Economic Management, 17*(5), 94-95. (in Chinese)

Xu, J., & Li, Q. (2001). An empirical analysis of the impact of macroeconomic policy on China's stock market. *Economic Research Journal, 46*(9), 12-21. (in Chinese)

Yang, X. L., Gao, M., & Zhu, L. (2016). The effects of social interaction on stock market: An empirical study of Sina Financial Blog. *Securities Market Herald, 25*(7), 50-58. (in Chinese)

Ye, B. (2015). The causes of the China's stock market crash. *Economic Daily*. doi:http://finance.eastmoney.com/news/1374,20150709525266665.html (in Chinese)

Yu, T. (1998). Discretion and policy stock market in China. *Journal of Suzhou University, 34*(2), 25-26. (in Chinese)

Zeng, F., Huang, W. C., & Hueng, J. (2016). On Chinese government's stock market rescue efforts in 2015. *Modern Economy*, 7(4), 411-418.

Zhang, C., & Shi, Q. (1998). Analysis of the formation mechanism of China's policy stock market. *Journal of Zhengzhou University(Philosophy and Social Science Edition), 43*(2), 16-21. (in Chinese)

Zhang, X. H., & Ye, C. L. (2012). Empirical study on the policy effects in China's stock markets. *Journal of Macroeconomic Research, 2*(4), 88-92. (in Chinese)

Zhao, J., Shen, Y., & Wu, F. (2014). Natural disasters and social violences events and stock prices. *Journal of Management Sciences in China, 17*(4), 19-33. (in Chinese)

Zhao, J. H., He, X., & Wu, F. Y. (2010). Study on rumors in China's stock market: The effects of rumors and official news on stock prices. *Management World, 35*(11), 38-51. (in Chinese)

Zhou, F. (1997). Study on policy-driven stock market in China. *Journal of ABC Wuhan Training College, 27*(6), 53-55. (in Chinese)

Zivney, T. L., Bertin, W. J., & Torabzadeh, K. M. (1996). Overreaction to takeover speculation. *The Quarterly Review of Economics and Finance, 36*(1), 89-115.

Zou, H. P., Tang, L. M., & Yuan, G. L. (2000). The effects of policy-related factors on China's stok market. *The Journal of World Economy, 22*(1), 20-28. (in Chinese)

Appendix A: Literature Review Summaries

Table A. 1: Summary of the Definitions of Policy Risk

	Definition of Policy risk
Holburn & Zelner (2008)	A government will opportunistically alter policies to expropriate a firm's profits or assets.
Born & Pfeifer (2014)	Uncertainty about fiscal and monetary policy.
Standard definition	The potential of gaining or losing something of value caused by policy-related uncertainty.
Definition in stock market in the current study	A possibility of change in benefits for investors due to unexpected government policy.

Table A. 2: Summary of the Findings on the Effects of Policy on Stock Markets

Type I: Monetary policy				
Author(s)	**Market(s)**	**Period**	**Technique**	**Findings**
Wright (1976)	US	1953-1975	DA (Descriptive Analysis)	The impact of the changes in monetary policy on the stock market is relatively quick and direct but it is hard to prove that the linkages are precise.
Darrat (1988)	Canada	1960-1984	MVR (Multivariate Regression)	Past monetary actions have an insignificant effect on current stock returns.
Hancock (1989)	US	1960-1985	VAR (Vector Auto-Regression)	Monetary has an insignificant influence on stock prices.
Rigobon et al. (2003)	US	1985-1999	VAR	There is a significant policy response to stock market, with a 5% rise (fall) in the S & P 500 index increasing the likelihood of a 25 basis point tightening (easing) by about a half.
Durham (2003)	16 countries	1956-2000	UVA (Univariate Regression) PR (Panel Regression)	The relationship between monetary policy and stock returns is weak or nonexistent; alternatively, measures of monetary policy indicate no correlation between easing/tightening cycles and stock returns.
Sun et al. (2003)	China	1993-2002	VAR	Monetary policy such as changes in interest rate has an insignificant impact on stock prices in China.
Chen et al. (2010)	China	2000-2008	GARCH (Generalized Auto-Regressive Conditional Heteroskedasticity)	Monetary policy has a significant impact on stock markets in China.
Pastor (2012)	-	-	LS (Laboratory Simulation)	Stock prices are expected to fall at the announcement of a policy change — hinges on the assumption that the government is quasi-benevolent.

Bekaert et al. (2013)	US	1990-2007	SVAR (Structural Vector Auto-Regression)	A lax monetary policy decreases both risk aversion and uncertainty, with the former effect being stronger.
Chatziantoniou et al. (2013)	Germany, UK and US	1991-2010	SVAR	Monetary policy influences the stock market significantly via either direct or indirect channels.
Campell *et al.* (2013)	US	1952-1987	VAR	Real interest rates have little impact on future excess stock returns but short-term interest rate does have significant effects on stock returns.
Hsing (2013)	Poland	1999-2012	GARCH	Poland's stock market index is negatively influenced by the money market rate.
Nave et al. (2015)	Eurozone	1999-2013	SVAR	In the international open-economy framework, a lax monetary policy, i.e., negative shocks in the monetary policy stance of both, Fed and ECB, increase the short-run the risk aversion of investors in the Eurozone stock market

Type II: Fiscal policy

Author(s)	Market(s)	Period	Technique	Findings
Darrat (1988)	Canada	1960-1984	MVR	Changes in the stance of fiscal policy play an important role in determining stock returns.
Hancock (1989)	US	1960-1985	VAR	Fiscal deficits have an insignificant influence on stock prices.
Bekhet et al. (2008)	Malaysia	199-2011	VECM (Vector Error Correction Model)	The fiscal tools play an important role in accelerating financial performance in Malaysia.
Jansen et al. (2008)	US	1954-2005	MVR	Fiscal deficit is not a direct information variable for the stock market; The impact of monetary policy on the asset markets varies with the state of fiscal deficits or surpluses.

Laopodis (2009)	US	1968-2005	VAR	Past budget deficits negatively affect current stock returns thus suggesting that the market is inefficient with respect to information about future fiscal policy actions.
Chen et al. (2010)	China	2000-2008	GARCH	Fiscal policy has an insignificant impact on China's stock market.
Hsing (2013)	Poland	1999-2012	GARCH	Poland's stock market index is not affected by the ratio of government deficits or debt.
Chatziantoniou et al. (2013)	Germany, UK and US	1991-2010	SVAR	Fiscal policies influence the stock market significantly via either direct or indirect channels.
Apergis (2015)	US	1980-2011	TVP-SVM (Stochastic Volatility in Mean)	In terms of fiscal policy, crises caused by financial sector distress fiscal expansions tend to increase the likelihood of earlier exit from a shock episode, the findings displayed a significant negative effect on stock returns.

Type III: Regulatory policy (1)

—— Margins

Author(s)	Market(s)	Period	Technique	Findings
Ferris et al. (1988)	US	1945-1974	ESM (Event Study Method)	There is little basis for the use of margin requirements to regulate volatility.
Hsieh et al. (1990)	US	1934-1987	ESM & MVR	There is no convincing evidence to support that Federal Reserve margin requirements have served to dampen stock market volatility.
Seguin (1990)	US	1976-1987	ESM & MVR	Margin trading does not lead to destabilization and margin eligibility increases the flow of information and enhances depth, furthermore, volatility and noise decrease with the inception of margin trading.

Hardouvelis (1990)	US	1934-1987	VAR	Margin requirements seem to be an effective policy tool in curbing destabilizing speculation.
Lee et al. (1993)	US, Korea, Taiwan, Japan	1975-1990	MVR & VAR	No convincing evidence to support that margins affect volatility in the long-run.
Hsu (1996)	Taiwan	1981-1991	MVR	There are significant short-term relationships between margin changes and volatility in a few cases.
Hardouvelis *et al.* (2002)	US	1934-1994	GARCH	Higher initial margin requirements are associated with lower subsequent stock market volatility during normal and bull periods, but show no relationship during bear periods.
Anshuman (2003)	-	-	-	The empirical evidence on the effectiveness of margins in controlling volatility does not appear to support the conclusion that margins can cause a reduction in price volatility.
Brumm et al. (2015)	-	-	TA &LS (Theoretical Analysis & Laboratory Simulation)	Changes in the margin regulation of stocks barely affect their volatility and only countercyclical margins on all assets can substantially reduce volatility.
Type III: Regulatory policy (2) —— Price limits				
Kim et al. (1997)	Japan	1989-1992	MVR	Price limits in Tokyo Stock Exchange may be ineffective in decreasing stock price volatility.

Kim et al. (2000)	Thailand Taiwan	1990-1993	MVR & GMM (Generalized Method of Moments)	Volatile stocks, actively traded stocks, and small market capitalization stocks hit price limits more often than other stocks.
Berkman et al. (2002)	Korea	1994-1996	UVR & MVR	The widening of price limits increased long-term volatility and reduced overall trading volume.
Westerhoff (2003)	-	-	LS (Laboratory Simulation) NSAPM (Nonlinear Stochastic Asset Pricing Model)	Price limits have the potential to reduce both volatility and deviations from fundamentals.
Anshuman (2003)	-	-	-	No causal link between price limits and volatility has yet been established.
Chen et al. (2005)	China	1999-2002	MVR & GMM	B-shares may be more inclined than A-shares to hit price limits simply because of their wider spreads.

Type III: Regulatory policy (3)

—— Circuit breakers

Schwert (1990)	US	1987	ESM	Circuit breaker may cause less liquidity and lead to increased volatility.
Greenwald et al. (1991)	US	-	TA (Theoretical Analysis)	Properly designed and implemented, circuit breakers may help to overcome some informational problems and thereby improve the market's ability to absorb large volume shocks.
Lauterbach et al. (1993)	US	1987	MVR	Trading halts and price limits have no impact on the overall decline of the stock market and some weak indications support that the trade halt helped cut the supply gap.

Subrahmanyam (1994)	US	-	TA	By causing agents to sub-optimally advance trades in time, circuit breakers may have the perverse effect of increasing price variability and exacerbating price movements.
Ackert et al. (1997)	US	1991-1993	ARIMA (Autoregressive Integrated Moving Average Model)	Circuit breaker is ineffective in altering the market's expectation of future volatility.
Anshuman (2003)	-	-	-	Circuit breakers cause higher market volatility other than reducing it when trading resumes after a trading halt.
Subrahmanyam (2013)	-	-	-	There is no evidence that breakers reduce volatility after trade recommences, and no evidence that they reduce panic-driven selling.

Type III: Regulatory policy (4)

—— Transaction taxes

Umlauf (1993)	Sweden	1980-1987	ESM	Volatility did not decline in response to the introduction of taxes although stock price levels and turnover did.
Anshuman (2003)	-	-	-	The measure of transaction tax can cause an increase in short run volatility.
Hu (1998)	Hong Kong, Japan, Korea, Taiwan	1975-1994	LR	On average, an increase in tax rate reduces the stock price but has no significant effect on market volatility and market turnover.
Green et al. (2000)	UK	1870-1986	GARCH	Changes in transactions costs have a significant and dependable effect on share price volatility.
Baltagi et al. (2006)	China	1996-1997	GARCH	The market’s volatility significantly increases after the increase in the tax rate.

Mannaro et al. (2008)	-	-	LS	Tax actually increases volatility and decreases trading volumes.
Su et al. (2011)	China	1991-2008	SGARCH	Levying the securities transaction tax on trading is not an effective tool to regulate the stock market, at least not in this emerging market.

Type III: Regulatory policy (5)

—— Laws, equity market liberalization and other policies

La Porta *et al.* (1998)	49 markets	1993-1995	MVR	Common law countries generally have the best and French civil law countries the worst, legal protections of investors, with German and Scandinavian civil law countries located in the middle.
Shi (2002)	China	1992-2001	ESM & LR	The implement of regulation policies increased the volatility of stock market twice as the normal level on average.
Brockman et al. (2003)	China	1996-1997	MVR	Firm liquidity is significantly affected by investor protection.
Allen et al. (2005)	China	1992-2000	MVR	The gradual and dual-track approaches in financial market reforms have positive effects on the stock market.
Bell et al. (2006)	-	-	Theoretical analysis	Asset price volatility is an inevitable consequence of financial market liberalization and, in extreme cases, generates asset price bubbles.
Lin (2006)	Taiwan	1994-2003	VAR	After the trade restrictions on foreign investors have been removed, foreign investors continue to increase their holdings and play an increasingly important role in Taiwan's stock market.
Lin et al. (2008)	China	1993-2005	VAR	Initial responses of investors to regulation of price limits, security law implementation, and removal of trade restrictions are negative. Opening A-share markets to foreign investors, however, creates positive responses for domestic Chinese markets.

Chen *et al.* (2008)	China	1999-2004	GARCH	The opening of the B-share market to domestic investors leads to a lower volatility while the opening of the A-share market to foreign investors has no measureable effect on volatility.

Type IV: Economic policy uncertainty

Author(s)	Market(s)	Period	Technique	Findings
Thorbecke (2001)	US	1974-1994	MVR	Greater monetary policy uncertainty and especially news about inflation explain the asset price declines in1994.
Chen et al. (2014)	China	1995-2013	GARCH	There is marketable negative correlation between the stock market and economic policy uncertainty.
Brogaard (2015)	US	1985-2013	MVR & GMM	The EPU index positively forecasts log excess market returns, and the index is an economically important risk factor for equities.
Apergis (2015)	US	1980-2011	SVM & GMM	In terms of monetary policy, despite the commitment of the central bank to maintain adequate levels of liquidity in the economy, the experience of the zero lower bound restriction and the subsequent implementation of unconventional monetary policy seem to have substantially contributed to higher monetary shocks uncertainty and lower stock returns.
Liu et al. (2015)	US	1996-2013	VAR	The EPU index exhibits significant predictive power of stock market volatility.
Donadelli et al. (2014)	East European and Latin American markets	1995-2012	GARCH	Correlations between industrial stock market excess returns and a measure of global economic policy uncertainty are consistently negative.
Donadelli (2015)	10 Asia markets	1988-2012	VAR	No evidence of a causal relationship (in Granger's sense) between macroeconomic conditions in the US and Asian stock market excess returns.

Chen et al. (2017)	China	1996-2013	MVR	EPU predicts negatively future stock market returns.
Li (2017)	China	1995-2014	MVR	Stocks with higher EPU betas earn higher average returns, and the EPU factor-mimicking portfolio earns significant abnormal returns. Loadings on the EPU factor positively forecast the cross-section of returns on various sets of portfolios or stocks.

Table A. 3: Summary of the Findings on the Impact of Public Information on Stock Markets

Type I: Firm-specific Media Coverage

Author(s)	Country /Regions	Period	Information Contents	Technique	Findings
Mitchell et a*l.* (1994)	US	1983-1990	Dow Jones News Announcements	UVR & MVR	The number of market and stock market activity are directly related.
Hamilton (1995)	US	1989	Negative news of TRI pollution releases	ESM	Negative, statistically significant abnormal returns upon the first release of the information.
Chan (2003)	US	1980-2000	Published firm-specific news	ESM &MVR	Incidence of a news story has a negative effect on stocks experienced negative returns.
Tetlock (2007)	US	1984-1999	Newspaper articles connected with selected keywords	VAR	High media pessimism induces downward pressure on market, and unusually high or low pessimism predicts high market trading volume.
Fang et al. (2009)	US	1993-2002	Newspaper articles connected with sample stocks	UVR & MVR	The breadth of information dissemination affects stock returns.
Engelberg et al. (2011)	US	1991-2007	Published firm-specific information	MVR	Media coverage has a significant effect on the stock market and share's trading.

Solomon (2012)	US	2002-2007	Published firm-specific information	MVR	Greater coverage of positive news leads to price increases in short term and lower returns in the future.
Griffin et al. (2011)	56 markets around the world	2003-2009	News articles from publications	SSVS & MVR (Bayesian Stochastic Search Variable Selection)	A firm's stock price moves much more on days with public news about the firm in most developed markets than the emerging markets.
Tetlock (2010)	US	1979-2007	News articles from publications	MVR	Media coverage coincides with temporarily higher correlations between absolute returns and volume.

Type II: Economic News

Author(s)	Country /Regions	Period	Information Contents	Technique	Findings
Pearce et al. (1985)	US	1977-1982	Announcements on money supply, inflation, real economic activity and discount rate	VAR	Monetary policy news significantly affect stock prices while there is only limited evidence of an impact from inflation surprises and no evidence of an impact from real activity news.
Chen et al. (1987)	US	1953-1983	Information about movements of macroeconomic variables	VAR	Economic news affect stock returns significant while share's prices are exposed to systematic economic news.
Jain (1988)	US	1978-1984	Economic news about money supply, CPI, PPI, industrial production and unemployment rate	VAR	News on money supply and CPI are significantly associated with stock price changes; another three variables do not affect stock prices significantly.

Schwert (1981)	US	1953-1978	Economic news about inflation	VAR	Stock prices adjust slowly to information on inflation.
McQueen et al. (1993)	US	1977-1988	Macroeconomic news from newspaper	VAR	A stronger relationship between stock prices and economic news is evident.
Cutler et al. (1989)	US	1871-1986	Macroeconomic news from newspaper	VAR	Less than one-third of the monthly return variance can be explained by economic news.
Boyd et al. (2005)	US	1957-2000	News about unemployment rate from Department of Labor	VAR	Stock prices rise when there is bad labour news during expansion and fall during contraction.

Type III: Important Events

Author(s)	**Countries /Regions**	**Period**	**Information Contents**	**Technique**	**Findings**
Niederhoffer (1971)	US	1950-1966	Headlines of world events from newspaper	CA (Contents Analysis)	World events exert a discernible influence on the movements of the stock market on average
Barnea (1974)	US	1967	Macro news from *New York Stock Exchange*	LR	Macro news plays a systematic role in the determination of the exchange volume and thus leads to a mutual dependency of volume and prices over time.
Bittlingmayer (1998)	Germany	1880-1940	Key political events in German history	NE (Natural Experiment)	Large stock market movements were the result of sudden, specific political developments.

Cutler et al. (1989)	US	1871-1986	Important world events news from newspaper	VAR	In very few cases it could be said with any confidence that a particular event led to the changes in the stock market.
Fair (2002)	US	1982-1999	Important events news from newspaper	DA	Events lead to large stock price changes but many large stock price changes have no events associated with them.
Zhao et al. (2014)	China	2007-2010	Events of natural disasters and social violence	ARMA (Auto-Regressive and Moving Average Model)	Both natural disasters and social violence events have significant negative impacts on stock prices of the listed companies where the events took place.

Type IV: Market Rumours

Author(s)	Country /Regions	Period	Information Contents	Technique	Findings
Rose (1951)	US	1937-1938 1948-1949	Firm related market rumours	Chi-square test	Rumour, on occasion, has had definite influence in directing the trend of stock prices.
Davies (1978)	US	1970-1971	Secondary dissemination of stock analysts' recommendations	ESM LR	Secondary dissemination of stock analysts' recommendations significantly affects stock prices.
Pound et al. (1990)	US	1983-1985	Takeover rumours reported in newspaper	ESM LR	Most takeover rumours are preceded by unusual price and volume activity in the stock of the rumoured target.
Zivney (1996)	US	1985-1988	Takeover rumours reported in newspaper	ESM	Rumours have important influences on stock prices and result in annualized excess returns averaging 20 percent.

Kiymaz (2001)	Turkish	1996-1997	Rumours reported in newspaper	ESM	Rumours result in positive significant abnormal returns in each of 4 days prior to the publication date and negative insignificant abnormal returns in the post-publication period.
Bommel (2003)	-	-	Rumours diffused between the investors	DGM (Dynamic Game Model)	Early followers can profit from trading on rumours if rumours are informative.
Zhao et al. (2010)	China	2005-2008	Rumours reported in newspaper	ESM	Rumours lead to abnormal shock to stock prices on the very day of the rumour publication and the previous trading day.

Type V: Other Information

Authors	Country /Regions	Period	Information Contents	Technique	Findings
Antweiler et al. (2004)	US	2000	Messages posted on internet stock message boards	MVR	Stock messages are helpful to predict market volatility.
Bonner et al. (2007)	US	1997-1999	Public media data about analysts	MVR	An analyst's level of media coverage can affect the initial market reaction to his/her forecast revisions
Schumaker et al. (2009)	US	2007	Internet financial news articles	SVM	International news has a predictable effect on stock prices.
Jin et al. (2013)	China	2012-2013	Messages posted on internet stock message boards	TMT & MVA (Text Mining Technology)	Higher bullish opinion predicts higher stock return and diversified opinions also contribute to a higher trading volume.
Dougal et al. (2012)	US	1970-2007	News articles from Wall Street Journal	UVR & LPM (Linear Probability Model)	Financial journalists and media coverage have the potential to influence investor behavior and the stock market at least over short time horizons.

Table A. 4: Summary of the Findings on the Policy-driven Stock Market in China

(1) Definition of policy-driven stock market

Author	Definition	Author(s)	Definition
Zhou (1997)	Government significantly affects stock markets.	Zhang et al. (1998)	There is too much regulator interference, severe fluctuations and massive social loss in the stock market. The stock market is often politically influenced by the government.
Chen (2002)	The phenomenon of the market moves caused by government policies.	Heilmann (2002)	Political calculations, policy and administrative interference are more important than the dynamics of market competition for determining price fluctuations; certain shares are excluded from trading; most powerful political and economic actors try to benefit from their control over state assets.
Liu (2005)	Government dominated stock market.	Jiang (2007)	Excessive government intervention in the market.

(2) Causes of policy-driven stock market

Author(s)	Causes	Author	Causes
Yu (1998)	Discretionary policy operation.	Qiao (2002)	Conflicting roles as both participant and regulator.
Han (2002)	Control the state-owned shares; Keep the controlling power of economy.	Heilmann (2002)	Control the state-owned shares; Conflicting policy missions.
Xiao (2003)	Discretionary policy operation.	Wang (2002)	A sound market regulatory system has not been fully established.

Xiang et al. (2004)	Political concerns; control the state-owned shares; conflicting policy missions.	Wang (2011)	Inappropriate way of policy decision making.

(3) Effects of policy driving

Author(s)	Period	Technique	Findings
Xu et al. (2001)	1994-2000	LR & ESM	Short term policies have a greater impact on the stock market than continuous policies.
Shi (2001)	1992-2001	LR	Policy intervention has a great effect on the stock market.
Lv et al. (2004)	1991-2002	LR & ESM	Policy-driving affects China's stock market significantly.
Li (2005)	2001-2002	LR	Policy such as price limits on the stock market does not induce the liquidity risk of the investors.
Peng et al. (2002)	1991-2000	LR	Regulatory agencies' interference imposes a significant impact on market fluctuations in the Shanghai Securities Market.
Hu (2003)	1990-2006	ESM	Government policies have significant effects on the volatility of China's stock market.
Qu et al. (2008)	1991-2007	MVR	Government intervention reduces the level of compensation ratio in equilibrium and thus expropriates the interest of tradable shareholders.
Wang et al.(2012)	1993-2009	MVR	Policy factors significantly affect the stock market volatility, including both upward and downward volatility, and policy factors explain more changes stock market volatility in the bull market than in the bear market, and they have a higher ability in explaining the downward volatility than the upward volatility.

Appendix B: Implementations of Monetary Policy in China

Table: B.1 Adjustments of Deposit Interest Rates (1990 – 2015)

Date	Current deposit	Term deposit						Up / Down
		3 months	6 months	1 year	2 years	3 years	5 years	
1990.04.15	2.88	6.30	7.74	**10.08**	10.98	11.88	13.68	↓
1990.08.21	2.16	4.32	6.48	**8.64**	9.36	10.08	11.52	↓
1991.04.21	1.80	3.24	5.40	**7.56**	7.92	8.28	9.00	↓
1993.05.15	2.16	4.86	7.20	**9.18**	9.90	10.80	12.06	↑
1993.07.11	3.15	6.66	9.00	**10.98**	11.70	12.24	13.86	↑
1996.05.01	2.97	4.86	7.20	**9.18**	9.90	10.80	12.06	↓
1996.08.23	1.98	3.33	5.40	**7.47**	7.92	8.28	9.00	↓
1997.10.23	1.71	2.88	4.14	**5.67**	5.94	6.21	6.66	↓
1998.03.25	1.71	2.88	4.14	**5.22**	5.58	6.21	6.66	↓
1998.07.01	1.44	2.79	3.96	**4.77**	4.86	4.95	5.22	↓
1998.12.07	1.44	2.79	3.33	**3.78**	3.96	4.14	4.50	↓
1999.06.10	0.99	1.98	2.16	**2.25**	2.43	2.70	2.88	↓
2002.02.21	0.72	1.71	1.89	**1.98**	2.25	2.52	2.79	↓
2004.10.29	0.72	1.71	2.07	**2.25**	2.70	3.24	3.60	↑
2006.08.19	0.72	1.80	2.25	**2.52**	3.06	3.69	4.14	↑
2007.03.18	0.72	1.98	2.43	**2.79**	3.33	3.96	4.41	↑
2007.05.19	0.72	2.07	2.61	**3.06**	3.69	4.41	4.95	↑
2007.07.21	0.81	2.34	2.88	**3.33**	3.96	4.68	5.22	↑
2007.08.22	0.81	2.61	3.15	**3.60**	4.23	4.95	5.49	↑
2007.09.15	0.81	2.88	3.42	**3.87**	4.50	5.22	5.76	↑
2007.12.21	0.72	3.33	3.78	**4.14**	4.68	5.40	5.85	↑
2008.10.09	0.72	3.15	3.51	**3.87**	4.41	5.13	5.58	↓
2008.10.30	0.72	2.88	3.24	**3.60**	4.14	4.77	5.13	↓
2008.11.27	0.36	1.98	2.25	**2.52**	3.06	3.60	3.87	↓
2008.12.23	0.36	1.71	1.98	**2.25**	2.79	3.33	3.60	↓
2010.10.19	0.36	1.91	2.20	**2.50**	3.25	3.85	4.20	↑
2010.12.26	0.36	2.25	2.50	**2.75**	3.55	4.15	4.55	↑
2011.02.09	0.40	2.60	2.80	**3.00**	3.90	4.50	5.00	↑
2011.04.06	0.50	2.85	3.05	**3.25**	4.15	4.75	5.25	↑

2011.06.08	0.50	3.10	3.30	**3.50**	4.40	5.00	5.50	↑
2012.06.07	0.40	2.85	3.05	**3.25**	4.10	4.65	5.10	↓
2012.07.06	0.35	2.60	2.80	**3.00**	3.75	4.25	4.75	↓
2014.11.22	0.35	2.35	2.55	**2.75**	3.35	4.00	-	↓
2015.03.01	0.35	2.10	2.30	**2.50**	3.10	3.73	-	↓
2015.05.11	0.35	1.85	2.05	**2.25**	2.85	3.50	-	↓
2015.06.28	0.35	1.60	1.80	**2.00**	2.60	3.25	-	↓
2015.08.26	0.35	1.35	1.55	**1.75**	2.35	3.00	-	↓
2015.10.24	0.35	1.10	1.30	**1.50**	2.10	2.75	-	↓

Notes: (1) ‘ ↓ ’ refers to the decrease in benchmark interest rates, and ‘ ↑ ’ refers to the increase in benchmark interest rates.

(2) ‘-’ means the interest rates remain unchanged.

Source: People's Bank of China**.** Official website: http://www.pbc.gov.cn

Table B.2: Adjustments of Deposit-Reserve Ratio (1998 – 2015)

Date	Before change	After change	Change (%)
2015.10.24	Large-size[1] 17.5%	17%	-0.5
	Small and Medium-size[2] 14%	13.5%	-0.5
2015.09.06	Large-size 18%	17.5%	-0.5
	Small and Medium-size 14.5%	14%	-0.5
2015.06.28	Large-size 18.5%	18%	-0.5
	Small and Medium-size 15%	14.5%	-0.5
2015.04.20	Large-size 19.5%	18.5%	-1
	Small and Medium-size 16%	15%	-1
2015.02.05	Large-size 20%	19.5%	-0.5
	Small and Medium-size 16.5%	16%	-0.5
2014.06.16	0.5% reduction for banks meeting loan requirements.		
2014.04.25	2% reduction for banks in county area. 0.5% reduction for banks in rural area.		
2012.07.18	Large-size 20.5%	20%	-0.5
	Small and Medium-size 17%	16.5%	-0.5
2012.05.18	Large-size 20.5%	20%	-0.5
	Small and Medium-size 17%	16.5%	
2012.02.24	Large-size 21%	20.5	-0.5
	Small and Medium-size 17.5%	17%	-0.5
2011.12.05	Large-size 21.5%	21%	-0.5
	Small and Medium-size 18%	17.5%	-0.5
2011.06.20	Large-size 21%	21.5%	0.5
	Small and Medium-size 17.5%	18%	0.5
2011.05.18	Large-size 20.5%	21%	0.5
	Small and Medium-size 17%	17.5%	0.5
2011.04.21	Large-size 20%	20.5%	0.5

	Small and Medium-size 16.5%	17%	0.5
2011.03.25	Large-size 19.5%	20%	0.5
	Small and Medium-size 16%	16.5%	0.5
2011.02.24	Large-size 19%	19.5%	0.5
	Small and Medium-size 15.5%	16%	0.5
2011.01.20	Large-size 18.5%	19%	0.5
	Small and Medium-size 15%	15.5%	0.5
2010.12.20	Large-size 18%	18.5%	0.5
	Small and Medium-size 14.5%	15%	0.5
2010.11.29	Large-size 17.5%	18%	0.5
	Small and Medium-size 14%	14.5%	0.5
2010.11.16	Large-size 17%	17.5%	0.5
	Small and Medium-size 13.5%	14%	0.5
2010.05.10	Large-size 16.5%	17%	0.5
	Small and Medium-size 13.5%	Remain unchanged	Remain unchanged
2010.02.25	Large-size 16%	16.5%	0.5
	Small and Medium-size 13.5%	Remain unchanged	Remain unchanged
2010.01.18	Large-size 15.5%	16%	0.5
	Small and Medium-size 13.5%	Remain unchanged	Remain unchanged
2008.12.25	Large-size 16%	15.5%	-0.5
	Small and Medium-size 14%	13.5%	-0.5
2008.12.05	Large-size 17%	16%	-1
	Small and Medium-size 16%	14%	-2
2008.10.15	Large-size 17.5%	17%	-0.5
	Small and Medium-size 16.5%	16%	-0.5
2008.09.25	Large-size 17.5%	17.5%	Remain unchanged
	Small and Medium-size 17.5%	16.5%	-1
2008.06.07	16.5%	17.5%	1

2008.05.20	16%	16.5%	0.5
2008.04.25	15.5%	16%	0.5
2008.03.18	15%	15.5%	0.5
2008.01.25	14.5%	15%	0.5
2007.12.25	13.5%	14.5%	1
2007.11.26	13%	13.5%	0.5
2007.10.25	12.5%	13%	0.5
2007.09.25	12%	12.5%	0.5
2007.08.15	11.5%	12%	0.5
2007.06.05	11%	11.5%	0.5
2007.05.15	10.5%	11%	0.5
2007.04.16	10%	10.5%	0.5
2007.02.25	9.5%	10%	0.5
2007.01.15	9%	9.5%	0.5
2006.11.15	8.5%	9%	0.5
2006.08.15	8%	8.5%	0.5
2006.07.05	7.5%	8%	0.5
2004.04.25	7%	7.5%	0.5
2003.09.21	6%	7%	1
1999.11.21	8%	6%	-2
1998.03.21	13%	8%	-5

Notes: (1) Large-size financial institutions include state-owned commercial banks and joint-stock commercial banks.

(2) Small and medium-size financial institutions include regional city commercial banks and rural credit cooperatives.

Source: People's Bank of China**.** Official website: http://www.pbc.gov.cn

Appendix C: Summary of China's Stock Market Performance

Table C.1: Changes in the SHCI caused by Adjustments to Interest Rates

Date	Implied Movements			Actual Movements		
	PD_{t-1}	PD_t	ED_t / PD_{t+1}	PD_{t-1}	PD_t	ED_t / PD_{t+1}
1991.04.21	+		+	–		–
1993.05.15	–	–	–	–	–	–
1993.07.11	–	–	–	–	–	–
1996.05.01	+	+	+	+	–	–
1996.08.23	+	+	+	+	–	–
1997.10.23	+	+	+	+	+	+
1998.03.25	+	+	+	+	–	–
1998.07.01	+	+	+	–	–	–
1998.12.07	+		+	–		–
1999.06.10	+	+	+	+	+	+
2002.02.21	+		+	–		+
2004.10.29	–	–	–	+	–	–
2006.04.28	–	–	–	+	–	+
2006.08.19	–	–	–	–	–	+
2007.03.18	–		–	–		+
2007.05.19	–	–	–	+	–	+
2007.07.21	–	–	–	–	+	+
2007.08.22	–	–	–	+	+	+
2007.09.15	–	–	–	+	+	+
2007.12.21	–	–	–	+	+	+
2008.10.09	+	+	+	–	–	–
2008.10.15	+	+	+	+	–	–
2008.10.30	+	+	+	+	–	+

2008.11.27	+	+	+	–	+	+
2008.12.23	+	+	+	+	–	–
2010.10.20	–	–	–	–	+	+
2010.12.26	–		–	–		–
2011.02.09	–		–	+		–
2011.04.06	–		–	+		+
2011.07.07	–	–	–	+	–	–
2012.06.08	+	+	+	–	–	–
2012.07.06	+	+	+	–	–	+
2014.11.22	+	+	+	+	+	+
2015.03.01	+		+	+		+
2015.05.11	+		+	+		+
2015.06.28	+		+	–		–
2015.08.26	+	+	+	–	–	–
2015.10.24	+	+	+	+	+	+

Source: Author's summaries from the Wind Database.

Table C.2: Changes in the SHCI Caused by Adjustments to the Deposit Reserve Ratio

Publication Date	Effective Date	Implied Movements				Actual Movements			
		PD_{t-1}	PD_t	PD_{t+1}	ED_t	PD_{t-1}	PD_t	PD_{t+1}	ED_t
2003.08.23	2003.09.21	–		–		–		–	
2004.04.11	2004.04.25	–		–		–		–	
2006.06.16	2006.07.05	–	–	–	–	+	+	+	+
2006.07.21	2006.08.15	–	–	–	–	+	+	+	+
2006.11.03	2006.11.15	–	–	–	–	–	+	+	+
2007.01.05	2007.01.15	–	–	–	–	+	–	+	+
2007.02.16	2007.02.25	–	–	–		+	+	+	
2007.04.05	2007.04.16	–	–	–	–	+	+	+	+
2007.04.29	2007.05.15	–		–	–	–		+	–
2007.05.18	2007.06.05	–	–	–	–	+	–	+	+
2007.07.30	2007.08.15	–	–	–	–	–	+	+	–
2007.09.06	2007.09.25	–	–	–	–	+	+	–	–
2007.10.13	2007.10.25	–		–	–	–		+	–
2007.11.10	2007.11.26	–		–	–	–		–	–
2007.12.08	2007.12.25	–		–	–	+		+	–
2008.01.16	2008.01.25	–	–	–	–	–	–	–	+
2008.03.18	2008.03.25	–	–	–	–	–	–	+	+
2008.04.16	2008.04.25	–	–	–	–	+	–	–	–
2008.05.12	2008.05.20	–	–	–	–	–	+	–	–
2008.06.07	2008.06.25	–		–	–	–		–	+
2008.09.15	2008.09.25	+		+	+	+		–	+
2008.10.08	2008.10.15	+	+	+	+	–	–	–	–
2008.11.26	2008.12.05	+	+	+	+	–	+	+	+
2008.12.22	2008.12.25	+	+	+	+	+	–	–	–
2010.01.12	2010.01.18	–	–	–	–	+	+	–	+

2010.02.12	2010.02.25	−	−	−	−	+	+	−	+
2010.05.02	2010.05.10	−		−	−	+		−	+
2010.11.09	2010.11.16	−	−	−	−	+	−	−	−
2010.11.19	2010.11.29	−	−	−	−	+	+	−	−
2010.12.10	2010.12.20	−	−	−	−	−	+	+	−
2011.01.14	2011.01.20	−	−	−	−	+	−	−	−
2011.02.18	2011.02.24	−	−	−	−	+	−	+	+
2011.03.18	2011.03.25	−	−	−	−	−	+	+	+
2011.04.17	2011.04.21	−		−	−	+		+	+
2011.05.12	2011.05.18	−	−	−	−	−	−	+	+
2011.06.14	2011.06.20	−	−	−	−	−	+	−	−
2011.11.30	2011.12.05	+	+	+	+	+	−	+	−
2012.02.18	2012.02.24	+		+	+	+		+	+
2012.05.12	2012.05.18	+		+	+	−		−	−
2015.02.04	2015.02.05	+	+	+	+	+	−	−	−
2015.04.19	2015.04.20	+		+	+	+		−	−
2015.06.27	2015.06.28	+		+		−		−	
2015.08.26	2015.09.06	+	+	+	+	−	−	+	−
2015.10.23	2015.10.24	+	+	+		+	+	+	
2016.02.29	2016.03.01	+	+	+	+	+	−	+	+

Source: Author's summaries from the Wind Database.

Appendix D: Causes of Big Index Movements in China's Stock Market

Table: D.1 The Causes of Big Index Movements with a Threshold of ±3%

Year	Index Falls		Index Rises	
	Policy	**Non-policy**	**Policy**	**Non-policy**
2001	4	3	1	2
2002	3	2	3	3
2003	0	1	1	4
2004	0	1	6	1
2005	1	0	2	2
2006	2	2	6	0
2007	9	11	9	6
2008	14	26	16	9
2009	6	7	7	7
2010	7	0	1	2
2011	2	1	1	0
2012	0	0	2	1
2013	1	1	3	0
2014	1	1	3	0
2015	18	5	18	2
2016*	1	1	2	2

Note: * The sample time is from January 2001 to March 2016.

Source: *Wind Database; China Securities Journal.*

Table: D.2 The Causes of Abnormal Index Movements with a Threshold of ±5%

Year	Index Rises		Index Falls	
	Policy	**Non-policy**	**Policy**	**Non-policy**
2001	1	0	0	1
2002	3	0	0	1
2003	1	0	0	0
2004	0	0	0	0
2005	1	1	0	0
2006	0	0	1	0
2007	0	1	3	2
2008	7	1	5	7
2009	1	0	3	0
2010	0	0	2	0
2011	0	0	0	0
2012	0	0	0	0
2013	0	0	1	0
2014	0	0	1	0
2015	3	0	11	1
2016*	0	0	0	0

Note: * The sample time is from January 2001 to March 2016.

Source: *Wind Database; China Securities Journal.*

Appendix E: Selected Sample Newspapers

Table E. 1: Basic Information of the Five Selected Sample Newspapers

	Newspaper	Basic Information
1	China Securities Journal (CSJ)	The China Securities Journal (CSJ) was founded in October 1992 and sponsored by Xinhua News Agency (XNA). CSJ is one of the most important publications in the financial field and mainly reports the securities and the financial markets, covering general economic trends in China and the world, macroeconomic policies, securities markets and listed companies. China Securities Journal is designated by the CSRC to disclose information on listed companies.
2	Shanghai Securities News (SSN)	Shanghai Securities News (SSN) was founded in 1991 and owned by Xinhua News Agency. SSN is China's leading financial newspaper and the CSRC's government designated channel for disclosure of Chinese-listed companies. Daily coverage of SSN focuses on the securities markets and company news, but also covers banking, insurance, foreign exchange, futures and real estate.
3	Securities Daily (SD)	SD was founded in 2000. It is a national financial newspaper managed by the Economic Daily Press Group that covers news on the securities market, insurance and banking industry. As the designated news publisher for CSRC, CIRC and CBRC, SD is accountable for the disclosure of official information of listed companies, insurance firms and banking institutions in China.

4	Securities Times (ST)	ST, which was published since 1993, is one of the official newspapers authorized by the CSRC to release news on Chinese listed companies. It mainly reports information and news on China's securities market. Securities Times aims to persist in guiding correct direction of public opinion, publicize related policies and regulations of the Chinese Communist Party and the government, release securities market information in standard for objectivity and accuracy and to provide the best services for investors, listed companies and brokerage firms.
5	Financial News (FN)	FN was founded in 1987 and managed by PBC. It is one of the popular comprehensive publications in financial field and mainly reports government financial policies, the financial and the securities markets. As the designated news publisher for CSRC, CIRC and CBRC, FN is accountable for the disclosure of official information of listed companies, insurance firms and banking institutions in China.

Source: All information is from the official websites of the sampled newspapers.

Table E.2: Ranking of the Top 12 Stock Market-Related Newspapers

Ranking	Newspaper	Chinese Name	Total Amount of Articles	Counts of Targeted Articles	Percentage
1	**China Securities Journal**	**中国证券报**	**197576**	**1633**	**8.27‰**
2	**Shanghai Securities News**	**上海证券报**	**193459**	**1379**	**7.13‰**
3	**Securities Daily**	**证券日报**	**93040**	**822**	**8.84‰**
4	**Securities Times**	**证券时报**	**117519**	**671**	**5.71‰**
5	**Financial News**	**金融时报**	**75612**	**504**	**6.67‰**
6	21st Century Business Herald	21 世纪经济报道	96555	338	3.50‰
7	China Business News	第一财经日报	128405	293	2.28‰
8	China Business Journal	中国经营报	51792	194	3.75‰
9	Economic Information Daily	经济参考报	53962	194	3.60‰
10	The Economic Observer	经济观察报	30068	97	3.23‰
11	Economic Daily	经济日报	78818	49	0.62‰
12	China Economic Herald	中国经济导报	48832	46	0.94‰

Notes: (1) Time period: 01/01/2005 - 31/12/2015

(2) Retrieval expression grammar: LY = '***Newspaper***' AND (FT = 'Securities Market' OR FT = 'Stock Market' OR FT = 'Capital Market' OR FT = 'Equity Market' OR FT = 'Financial Market') AND (FT = 'Market Rumour' OR FT = 'Market Expectation' OR FT = 'Policy Information' OR FT = 'Policy News' OR FT = 'Policy Intervention' OR FT = 'Policy Regulation') AND (FT = 'Risk' OR FT = 'Uncertain' OR FT = 'Uncertainty') AND (FT = 'Regulatory Authorities' OR FT = 'Managerial Authorities' OR FT = 'Regulatory Department' OR FT = 'CSRC')

Source: CCNFD: https://www.cnki.net.

Table E.3: Counts of Stock Articles in the Selected Newspapers

Year	China Securities Journal	Shanghai Securities News	Securities Daily	Securities Times	Financial News	Total Number	Ratio
2005	1492	1178	434	836	247	7383	0.57
2006	1775	1657	1828	882	563	12444	0.54
2007	2307	2550	2274	916	582	17760	0.49
2008	1848	2335	1274	1080	327	14611	0.47
2009	1385	1581	686	893	190	9670	0.49
2010	922	1250	501	781	148	8228	0.44
2011	901	1165	725	832	155	8862	0.43
2012	1319	1456	906	1162	314	10459	0.49
2013	1456	1383	1090	1363	396	12126	0.47
2014	1587	1332	1071	1364	428	13095	0.44
2015	1686	1409	1013	1430	455	15275	0.39

Notes: (1) Time period: 01/01/2005 - 31/12/2015;

(2) Ratio is the percentage of stock market-related articles in the five selected newspapers to the total number of articles in over 500 newspapers in CCNFD.

(3) Retrieval expression grammar: LY = '***Newspaper***' AND (KY = 'Shares' OR KY = 'Stock Market' OR KY = 'Capital Market' OR KY = 'Securities Market' OR KY = 'Equity Market' OR KY = 'Main Board' OR KY = ' Small and Medium Enterprise Board ' OR KY = ' Growth Enterprise Board ')

Source: CCNFD: https://www.cnki.net .

Table E.4: 5 Groups of Selected Sample Newspapers

Group	Newspaper	Chinese Name
Group **A**	**China Securities Journal**	**中国证券报**
	Shanghai Securities News	**上海证券报**
	Securities Daily	**证券日报**
	Securities Times	**证券时报**
	Financial News	**金融时报**
Group B	China Securities Journal	中国证券报
Group C	China Economic Herald	中国证券报
	Securities Times	证券时报
	China Business Journal	中国经营报
	People's Daily	人民日报
	Economic Daily	经济日报
Group D	China Securities Journal	中国证券报
	Securities Times	证券时报
	Financial News	金融时报
	China Business Journal	中国经营报
	Economic Information Daily	经济参考报
	Economic Daily	经济日报
	China Financial and Economic News	中国财经报
	People's Daily	人民日报
Group E	All the newspapers with titles including 'securities', 'financial', 'financial and economic' or 'economic' in CNNFD	CNNFD 中所有刊名中含有"证券"、"金融"、"财经"或"经济"的报纸

Appendix F: Top 10 Financial News Websites

Table F.1: Ranking of the Leading Financial News Websites in China

Ranking	Name	Website	Language
1	Eastmoney	http://www.eastmoney.com	Chinese
2	Hexun	http://www.hexun.com	Chinese
3	Sina Finance	http://finance.sina.com.cn	Chinese
4	Tencent Finance	http://finance.qq.com	Chinese
5	China Economic Net	http://www.ce.cn	Multilingual
6	JRJ	http://www.jrj.com.cn	Chinese
7	Netease Finance	http://money.163.com	Chinese
8	Stockstar	http://www.stockstar.com	Chinese
9	Ifeng Finance	http://finance.ifeng.com	Chinese
10	CNFOL	http://www.cnfol.com	Chinese

Source: China's financial media market situation and forecast report (2014-2019), Zhiyan Consulting Group, 05, 2014.

Appendix G: Key Term Library

Table G. 1: Key Term Library

Category A: Keywords related to the stock markets					
No.	**Chinese (中文)**	**English**	**No.**	**Chinese (中文)**	**English**
1	股票市场	Stock/Equity Market	**9**	股市	Stock/Equity Market
2	资本市场	Capital Market	**10**	沪市	Shanghai Stock Market
3	金融市场	Financial Market	**11**	深市	Shenzhen Stock Market
4	证券市场	Securities Market	**12**	主板	Main Board
5	上证综指	Shanghai Composite Index	**13**	创业板	Growth Enterprise Board
6	深证成指	Shenzhen Component Index	**14**	中小板	Small and Medium Enterprise Board
7	A 股	A-share	**15**	新三板	New Third Board
8	B 股	B-share	**16**	股指	Stock Index
Category B: Keywords related to regulatory authorities					
No.	**Chinese (中文)**	**English**	**No.**	**Chinese (中文)**	**English**

1	监管层	Regulatory Authorities	6	周小川	Xiaochuan Zhou
2	管理层	Managerial Authorities	7	尚福林	Fulin Shang
3	监管部门	Regulatory Department	8	郭树清	Shuqing Guo
4	证监会	CSRC	9	肖钢	Gang Xiao
5	决策层	Policymakers	10	刘士余	Shiyu Liu

Category C: Keywords related to regulatory policies, laws or actions

No.	Chinese (中文)	English	No.	Chinese (中文)	English
1	国有股减持	Reduction of State-owned Shares	17	融资融券/两融	Margin Trading
2	全流通	Full Circulation	18	降杠杆	Deleverage
3	股权分置(改革)	Non-tradable Share Reform	19	场外配资	Social Stock Financing
4	大小非	Non-tradable Share	20	市场扩容	Market Expansion
5	新股发行/IPO	Initial Public Offering	21	熔断	Circuit Breaker
6	政策调控	Policy Regulation	22	限售股	Restricted Stock
7	政策预期	Policy Expectation	23	政策干预	Policy Intervention
8	监管政策	Regulatory Policy	24	市场监管	Market Regulation

9	利空政策	Negative Policy	25	交易印花税	Transaction Stamp Tax
10	利多政策	Positive Policy	26	汇金增持	Central Huijin Buying
11	改革牛	Reform Bull	27	汇金减持	Central Huijin Selling
12	创新牛	Innovation Bull	28	注册制	Registration-based IPO System
13	政策牛	Policy Bull	29	救市	Stock-Market Bailout
14	沪港通	Shanghai-Hong Kong Stock Connect	30	深港通	Shenzhen-Hong Kong Stock Connect
15	政策面	Policy News	31	消息面	Policy Information
16	市场预期	Market Expectation	32	市场传言	Market Rumour

Category D: Keywords related to policy risk or market uncertainty

No.	Chinese (中文)	English	No.	Chinese (中文)	English
1	不确定性	Uncertainty	4	不确定	Uncertain
2	风险	Risk	5	政策风险	Policy Risk
3	政策不确定性	Policy Uncertainty	6	风险预警	Risk Warning

Table G. 2: Simplified Key Term Library

Category A: Keywords related to the stock markets

No.	Chinese (中文)	English	No.	Chinese (中文)	English
1	股票市场	Stock/Equity Market	4	股市	Stock/Equity Market
2	资本市场	Capital Market	5	证券市场	Securities Market
3	金融市场	Financial Market			

Category B: Keywords related to regulatory authorities

No.	Chinese (中文)	English	No.	Chinese (中文)	English
1	监管层	Regulatory Authorities	3	监管部门	Regulatory Department
2	管理层	Managerial Authorities	4	证监会	CSRC

Category C: Keywords related to regulatory policies, laws or actions

No.	Chinese (中文)	English	No.	Chinese (中文)	English
1	政策调控	Policy Regulation	6	政策干预	Policy Intervention
2	市场预期	Market Expectation	7	市场传言	Market Rumour
3	政策面	Policy News	8	消息面	Policy Information

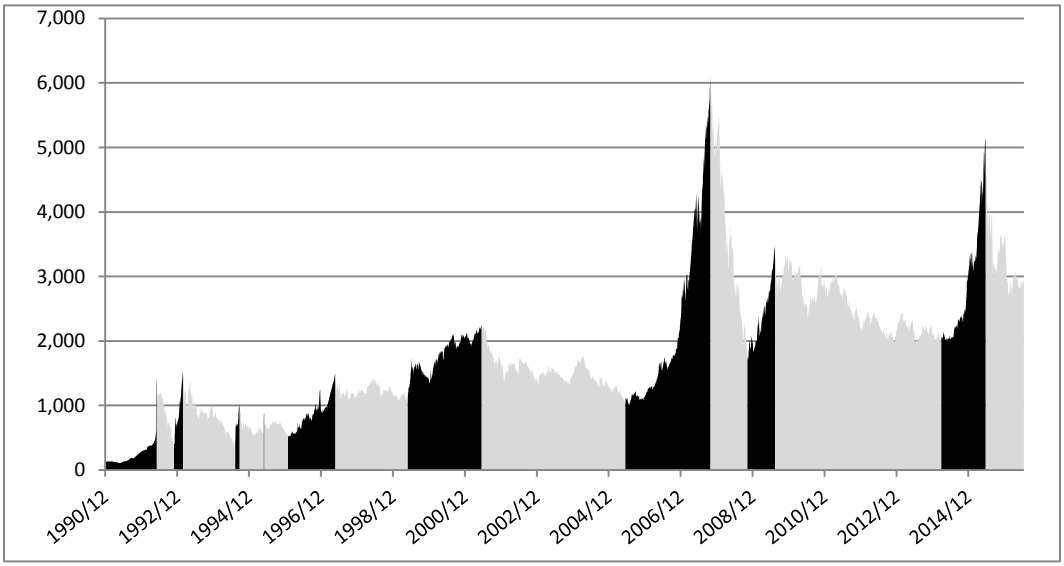
4	市场监管	Market Regulation	9	监管政策	Regulatory Policy
5	利空政策	Negative Policy	10	利多政策	Positive Policy

Category D: Key words related to policy risk or market uncertainty

No.	Chinese (中文)	English	No.	Chinese (中文)	English
1	不确定性	Uncertainty	3	不确定	Uncertain
2	风险	Risk			

Appendix H: Basic Statistics of China's Stock Market

Figure H.1 Changes in Shanghai Composite Index (1990.12-2016.06)

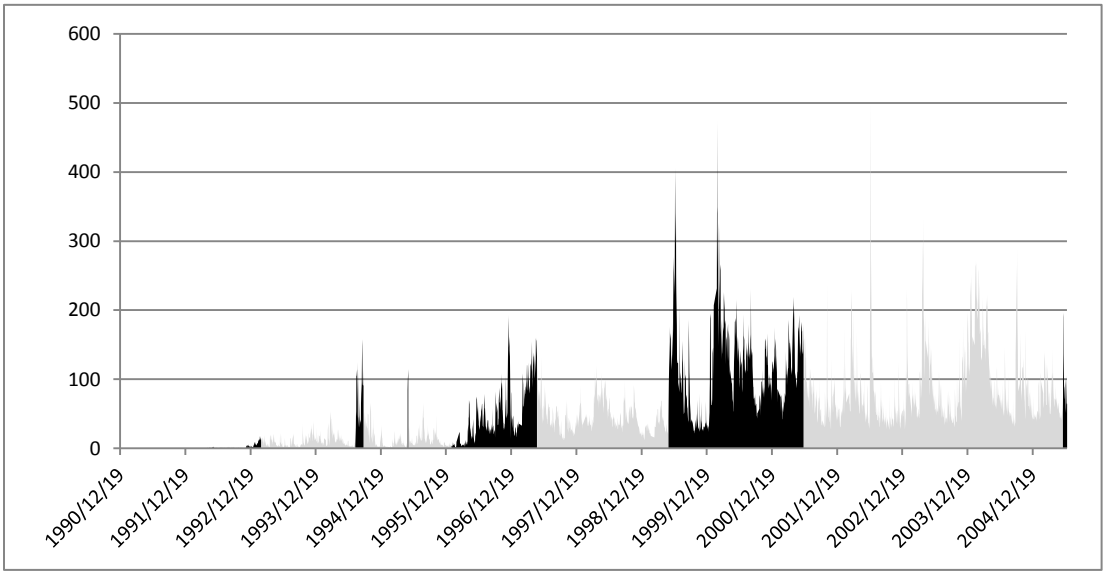


Notes: (1) The bear markets are shown in grey and the bull markets are shown in black in the figure.

(2) The figure is based on the changes in trading volume on the Shanghai Stock Exchange from January 2000 to May 2016.

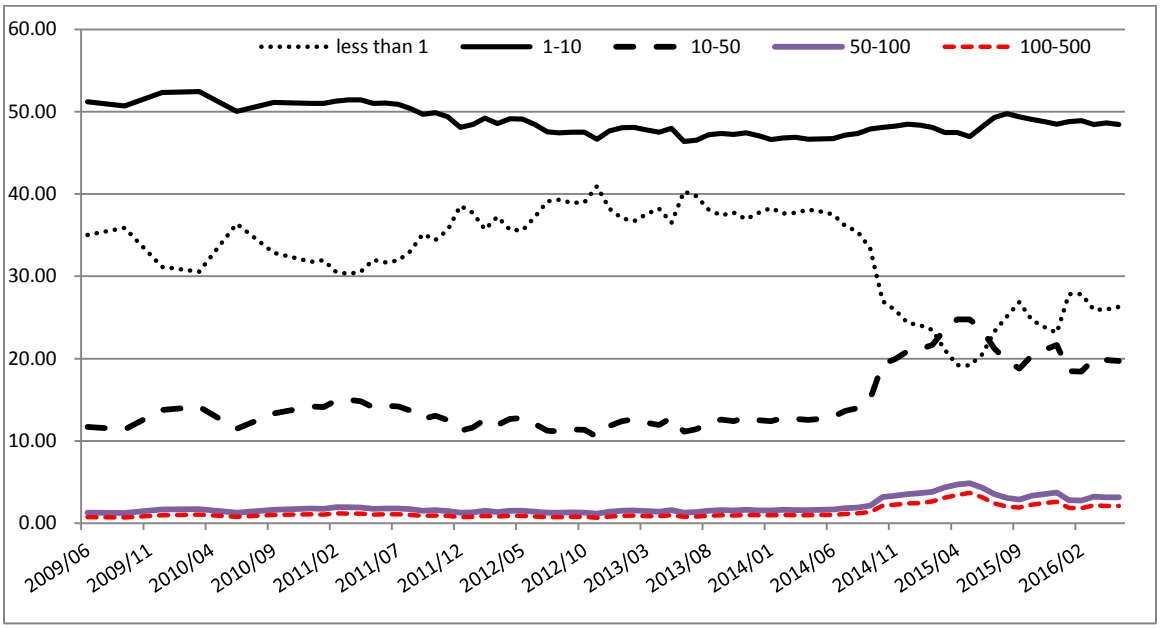
Source: Author's summaries based on the *Wind Database*.

Figure H.2 Changes in the Trading Volume in China's Stock Markets



Notes: (1) The bear markets are shown in grey and the bull markets are shown in black in the figure.
(2) The figure is based on the change in trading volume in Shanghai Stock Exchange from 1990 to 2005.
Source: Author's summaries based on the *Wind Database*.

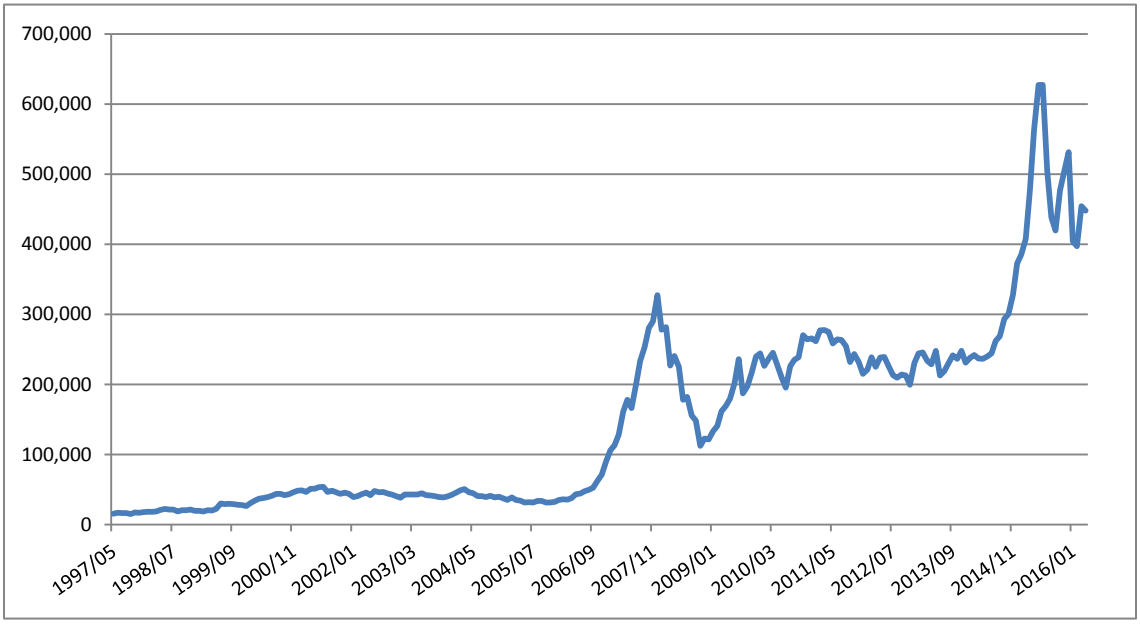
Figure H.3 Changes in Accounts with Long Positions and Short Positions (%)



Notes: The ratio is calculated based on the number of the A-share accounts with closing short positions and long positions. (Unit: 10 thousand)

Source: *Wind Database*.

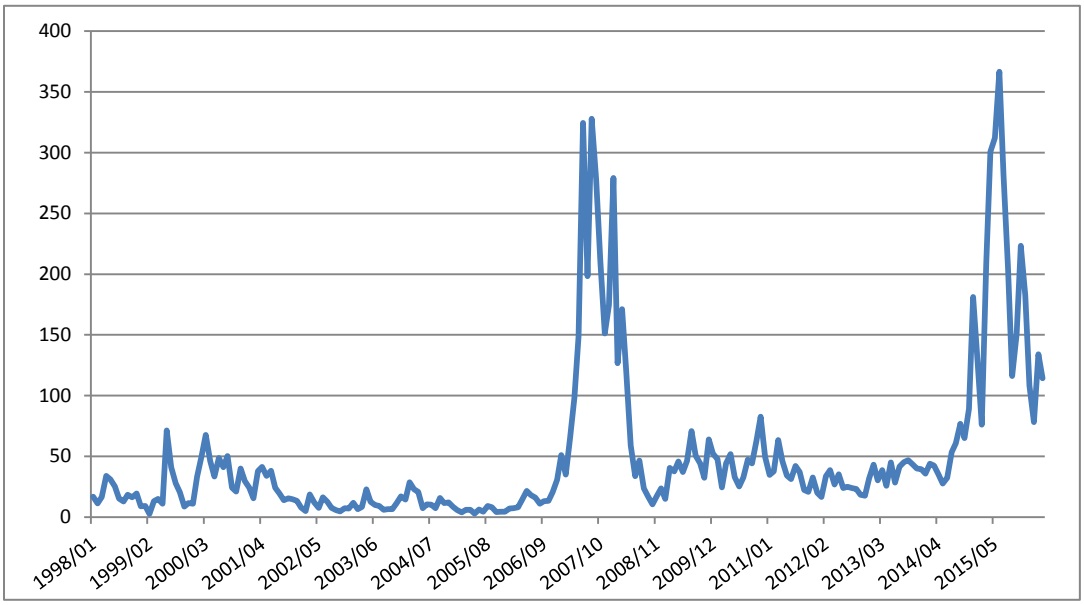
Figure H.4 Total Market Capitalization of Listed Companies in China



Note: Unit: 100 million.

Source: *Wind Database*.

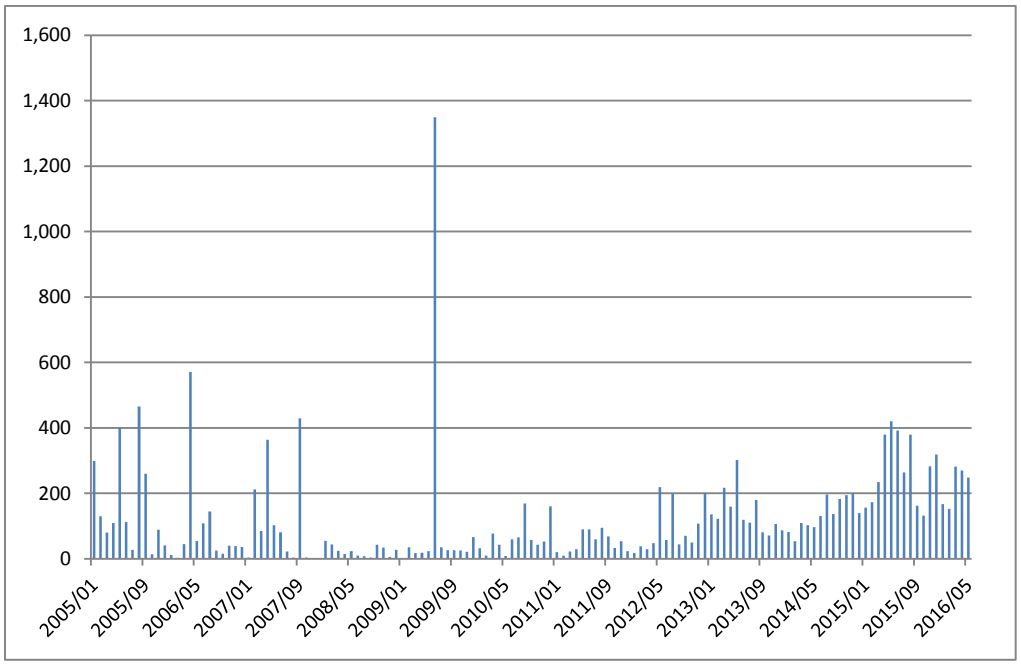
Figure H.5 Changes in the Transaction Stamp Tax in China



Notes: Unit: 100 million.

Source: *Wind Database*.

Figure H.6 Monthly New-Opened Stock Trading Accounts in the A-share Market



Notes: Unit: 10 thousand.

Source: *Wind Database*.

Appendix I: Correlation Coefficients of the Variables

Table I.1: Correlation Coefficients of the Independent Variables in Category A

	PRI	EPUC	EPUA
PRI	1.0000	0.1201	-0.1224
EPUC	0.1201	1.0000	0.5532
EPUA	-0.1224	0.5532	1.0000

Notes: Category A refers to the variables of policy risk and/or uncertainty. PRI: Policy risk index.
EPUA: The index of the economic policy uncertainty in the US;
EPUC: The index of the economic policy uncertainty in China.

Source: Author's calculations.

Table I.2: Correlation Coefficients of the Independent Variables in Category B

	RS	MS	IR	IP	INF	ER
RS	1.0000	0.2579	0.1641	0.1637	0.6727	-0.1454
MS	0.2579	1.0000	-0.5054	0.4261	-0.1837	-0.4275
IR	0.1641	-0.5054	1.0000	-0.2325	0.4690	0.4355
IP	0.1637	0.4261	-0.2325	1.0000	0.2114	-0.7097
INF	0.6727	-0.1837	0.4690	0.2114	1.0000	-0.0955
ER	-0.1454	-0.4275	0.4355	-0.7097	-0.0955	1.0000

Notes: (1) Category B refers to the six macroeconomic variables: ER: Exchange rate; INF: Inflation rate; IP: Industrial production; IR: Interest rate; MS: Money supply; RS: Retail sales.

(2) The results show that RS and IP are negatively related to ER. On the one hand, retails sales and industrial production are the two main drivers for economic growth, and Renminbi appreciates when these two indicators increase steadily because steady economic growth attracts foreign capitals and thus increase the demand for Renminbi. On the other hand, in bad times, the growth of retail sales and industrial production slow down. It comes with the depreciation of Renminbi as exchange rate can be used as a tool to boost exportation and further stabilizes economic growth.

Source: Author's calculations.

Table I.3: Correlation Coefficients of the Independent Variables after De-trending

	EPUA	EPUC	PRI	ERD	INF	IPD	MSD	IR	RSD	SED	SVD
EPUA	1.0000	0.5550	-0.1242	0.1272	-0.0087	0.0251	0.0375	0.1167	-0.0703	-0.0981	0.0124
EPUC	0.5550	1.0000	0.1218	0.1080	0.0176	-0.0809	0.0599	0.1597	-0.0196	-0.0554	-0.0290
PRI	-0.1242	0.1218	1.0000	0.0566	0.2296	0.0262	0.0917	0.2316	0.0443	0.0922	-0.0374
ERD	0.1272	0.1080	0.0566	1.0000	0.1992	-0.1704	-0.1278	0.2638	-0.0671	0.0272	-0.0027
INF	-0.0087	0.0176	0.2296	0.1992	1.0000	-0.1534	-0.2630	0.4691	0.0913	0.2080	-0.0139
IPD	0.0251	-0.0809	0.0262	-0.1704	-0.1534	1.0000	0.0364	-0.0726	-0.3819	0.0297	0.0299
MSD	0.0375	0.0599	0.0917	-0.1278	-0.2630	0.0364	1.0000	-0.2115	0.1516	0.0422	0.0054
IR	0.1167	0.1597	0.2316	0.2638	0.4691	-0.0726	-0.2115	1.0000	-0.0179	0.0303	0.0322
RSD	-0.0703	-0.0196	0.0443	-0.0671	0.0913	-0.3819	0.1516	-0.0179	1.0000	0.0368	0.0153
SED	-0.0981	-0.0554	0.0922	0.0272	0.2080	0.0297	0.0422	0.0303	0.0368	1.0000	-0.0157
SVD	0.0124	-0.0290	-0.0374	-0.0027	-0.0139	0.0299	0.0054	0.0322	0.0153	-0.0157	1.0000

Notes: ERD, IPD, MSD, RSD, SED and SVD are all de-trended by first-order differencing.

Source: Author's calculations.

Appendix J: Descriptive Statistics of the Variables

Table J.1: Descriptive Statistics of the Dependent Variables

	Vol	Vol^{upward}	$Vol^{downward}$
Mean	6.7371	2.9540	2.9943
Median	5.8400	2.4500	2.4800
Maximum	17.7300	11.1700	9.5800
Minimum	2.2900	0.9900	0.7400
Std. Dev.	3.2385	1.6643	1.6074
Skewness	1.3509	1.9431	1.3652
Kurtosis	4.3062	7.5783	4.8724
Sum Sq. Dev.	1929.7320	509.6766	475.4119
Observations	185	185	185

Source: Author's calculations.

Table J.2: Descriptive Statistics of the Independent Variables in Category A

	PRI	**EPUC**	**EPUA**
Mean	5.2987	4.7257	4.7207
Median	5.3882	4.6861	4.6916
Maximum	6.3924	5.9744	5.6478
Minimum	3.7025	3.2635	3.8018
Std. Dev.	0.5075	0.5575	0.3755
Skewness	-0.7998	-0.1151	0.0456
Kurtosis	3.7433	2.7149	2.6879
Observations	185	185	185

Notes: Category A refers to the variables of policy risk and/or uncertainty. PRI: Policy risk index.
EPUA: The index of the economic policy uncertainty in the US;
EPUC: The index of the economic policy uncertainty in China;
All variables take log form.

Source: Author's calculations.

Table J.3: Descriptive Statistics of the Independent Variables in Category B

	ER	INF	IP	IR	MS	RS
Mean	100.6044	2.3756	12.7074	2.7382	16.5235	13.7247
Median	98.2700	2.0000	13.3000	2.4800	15.7000	13.2100
Maximum	131.6500	8.7000	29.2000	6.9800	29.7400	23.3000
Minimum	81.8900	-1.8000	-2.9300	0.9900	10.1000	4.3000
Std. Dev.	13.8019	2.1732	4.8301	0.9950	3.8697	3.7229
Skewness	0.7292	0.5733	-0.0853	0.9578	1.4380	0.5364
Kurtosis	2.5529	3.2172	3.1585	4.3914	5.2653	2.8413
Observations	185	185	185	185	185	185

Notes: Category B refers to the six macroeconomic variables: ER: Exchange rate; INF: Inflation rate; IP: Industrial production; IR: Interest rate; MS: Money supply; RS: Retail sales.

Source: Author's calculations.

Table J.4: Descriptive Statistics of the Independent Variables in Category C

	SE	SV
Mean	0.3692	10050.39
Median	0.3777	4634.00
Maximum	0.5844	28034.00
Minimum	0.1931	686.00
Std. Dev.	0.1357	9710.86
Skewness	0.1678	0.5412
Kurtosis	1.4663	1.6594
Observations	185	185

Notes: Category C refers to the stock market-specific variables.

SE: Weighted earnings per share; SV: The volume of shares in circulation.

Source: Author's calculations.

Appendix K: Results of Parameter Estimations

Table K.1 Effects of PRI on the Volatility of China's Stock Market (Full Sample)

Variables \ Series	(1)	(2)	(3)	(4)	(5)
$\log PRI_t$	**0.1297 (2.72)*** **	**0.1331 (2.77)*** **	**0.1313 (2.71)*** **	**0.1502 (2.98)*** **	**0.1435 (2.89)*** **
$\log EPUA_t$		0.0414 (0.64)		0.0006 (1.10)	
$\log EPUC_t$			-0.0099 (-0.22)		
INF_t				**0.0265 (1.97)*** *	**0.0218 (1.67)*** *
$d\,MS_t$				0.0133 (0.52)	
IR_t				**-0.0614 (-2.05)****	-0.0446 (-1.54)
$d\,ER_t$				0.0251 (1.40)	
$d\,RS_t$				-0.0125 (-0.86)	
$d\,IP_t$				0.0076 (1.22)	
$d\,SV_t$				**0.0001 (1.66)*** *	0.0001 (1.65)
$d\,SE_t$				-0.6099 (-0.50)	
$\log Vol_t\,(-1)$	**0.4790 (6.64)*** **	**0.4772 (6.60)*** **	**0.4802 (6.62)*** **	**0.4340 (5.94)*** **	**0.4485 (6.16)*** **
$\log Vol_t\,(-2)$	**0.2007 (2.80)*** **	**0.1990 (2.76)*** **	**0.2022 (2.80)*** **	**0.1811 (2.52)****	**0.1823 (2.53)****
$Adjusted-R^2$	0.4345	0.4326	0.4315	0.4502	0.4431

Notes: ***, **, *: 1%, 5% and 10% level of statistical significance, respectively; *t*-test in parentheses.

Source: Author's calculations.

Table K.2 Effects of PRI on the Upward Volatility of China's Stock Market (Full Sample)

Variables \ Series	(1)	(2)	(3)	(4)	(5)
$\log PRI_t$	**0.1602 (2.59)****	**0.1690 (2.71)*****	**0.1499 (2.39)****	**0.1831 (2.78)*****	**0.1679 (2.62)*****
$\log EPUA_t$		0.1039 (1.24)		0.1240 (1.45)	
$\log EPUC_t$			0.0632 (1.09)		
INF_t				**0.0496 (2.76)*****	**0.0356 (2.12)****
dMS_t				0.0153 (0.46)	
IR_t				**-0.0932 (-2.41)****	**-0.0654 (-1.76)***
dER_t				0.0284 (1.23)	
dRS_t				-0.0063 (-0.33)	
dIP_t				0.0118 (1.47)	
dSV_t				-	
dSE_t				-	
$\log Vol_t^{upward}(-1)$	**0.2740 (3.84)*****	**0.2676 (3.75)*****	**0.2635 (3.67)*****	**0.2262 (3.12)*****	**0.2430 (3.38)*****
$\log Vol_t^{upward}(-2)$	**0.2372 (3.35)*****	**0.2297 (3.24)*****	**0.2303 (3.25)*****	**0.1872 (2.59)****	**0.2121 (2.98)*****
$Adjusted-R^2$	0.2186	0.2209	0.2194	0.2484	0.2324

Notes: ***, **, *: 1%, 5% and 10% level of statistical significance, respectively; '-': not reported because the value is too small; *t*-test in parentheses.

Source: Author's calculations.

Table K.3 Effects of PRI on the Downward Volatility of China's Stock Market (Full Sample)

Variables \ Series	(1)	(2)	(3)	(4)
$\log PRI_t$	0.0956 (1.56)	0.0952 (1.54)	0.1016 (1.63)	0.0949 (1.43)
$\log EPUA_t$		-0.0057 (-0.07)		-
$\log EPUC_t$			-0.0331 (-0.58)	
INF_t				0.0256 (1.41)
$d\,MS_t$				0.0214 (0.65)
IR_t				-0.0495 (-1.28)
$d\,ER_t$				0.0147 (0.63)
$d\,RS_t$				-0.0201 (-1.03)
$d\,IP_t$				0.0092 (1.13)
$d\,SV_t$				0.0001 (1.64)
$d\,SE_t$				0.5722 (0.36)
$\log Vol_t^{downward}(-1)$	**0.4454** **(6.03)*****	**0.4457** **(6.01)*****	**0.4475** **(6.04)*****	**0.4170** **(5.49)*****
$\log Vol_t^{downward}(-2)$	**0.1479** **(2.01)****	**0.1479** **(2.00)****	**0.1529** **(2.06)****	**0.1364** **(1.83)***
$Adjusted-R^2$	0.2968	0.2929	0.2941	0.2971

Notes: ***, **, *: 1%, 5% and 10% level of statistical significance, respectively; '-': not reported because the value is too small; *t*-test in parentheses.

Source: Author's calculations.

Table K.4 Effects of PRI on the Volatility of China's Stock Market (Bull Market)

Series / Variables	(1)	(2)	(3)	(4)	(5)
$\log PRI_t$	**0.2840 (2.36)****	**0.2926 (2.40)****	**0.2860 (2.35)****	**0.2537 (1.89)***	**0.3177 (2.93)*****
$\log EPUA_t$		0.0874 (0.63)		-0.1401 (-0.98)	
$\log EPUC_t$			-0.0306 (-0.30)		
INF_t				**-0.1604 (-2.47)****	**-0.1650 (-3.65)*****
$d\,MS_t$				0.0230 (0.65)	
IR_t				-0.0038 (-0.07)	
$d\,ER_t$				0.0106 (0.44)	
$d\,RS_t$				0.0559 (1.43)	
$d\,IP_t$				0.0267 (1.65)	
$d\,SV_t$				-	
$d\,SE_t$				0.1288 (0.06)	
$\log Vol_t\,(-1)$	**0.5476 (4.90)*****	**0.5364 (4.72)*****	**0.0565 (4.77)*****	**0.6509 (5.62)*****	**0.5639 (5.63)*****
$Adjusted-R^2$	0.4194	0.4124	0.4086	0.5300	0.5341

Notes: $^{***,\,**,\,*}$: 1%, 5% and 10% level of statistical significance, respectively; '-': not reported because the value is too small; *t*-test in parentheses.

Source: Author's calculations.

Table K.5 Effects of PRI on the Upward Volatility of China's Stock Market (Bull Market)

Series / Variables	(1)	(2)	(3)	(4)	(5)
$\log PRI_t$	0.1909 (1.42)	0.2029 (1.50)	0.1853 (1.36)	0.1596 (1.05)	0.1172 (0.86)
$\log EPUA_t$		0.1582 (1.02)		-	
$\log EPUC_t$			0.0578 (0.49)		
INF_t				-0.1031 (-1.40)	
$d\,MS_t$				0.0423 (1.04)	
IR_t				-0.0178 (-0.27)	
$d\,ER_t$				0.0211 (0.78)	
$d\,RS_t$				**0.0826** **(1.76)***	0.0630 (1.64)
$d\,IP_t$				**0.0476** **(2.41)****	**0.0365** **(2.29)****
$d\,SV_t$				-	
$d\,SE_t$				-	
$\log Vol_t^{upward}(-1)$	**0.4279** **(3.52)*****	**0.4148** **(3.40)*****	**0.4127** **(3.27)*****	**0.5264** **(4.10)*****	**0.5586** **(4.27)*****
$Adjusted-R^2$	0.2251	0.2256	0.2132	0.3591	0.2725

Notes: ***, **, *: 1%, 5% and 10% level of statistical significance, respectively; '-': not reported because the value is too small; *t*-test in parentheses.

Source: Author's calculations.

Table K.6 Effects of PRI on the Downward Volatility of China's Stock Market (Bull Market)

Series / Variables	(1)	(2)	(3)	(4)	(5)
$\log PRI_t$	**0.5362 (3.33)*****	**0.5383 (3.29)*****	**0.5411 (3.31)*****	**0.6353 (3.35)*****	**0.5730 (3.76)*****
$\log EPUA_t$		0.0221 (0.12)		-	
$\log EPUC_t$			-0.0412 (-0.30)		
INF_t				**-0.1638 (-1.76)***	**-0.1731 (-2.68)*****
$d\,MS_t$				0.0427 (0.84)	
IR_t				-0.0753 (-0.91)	
$d\,ER_t$				0.0308 (0.90)	
$d\,RS_t$				0.0162 (0.29)	
$d\,IP_t$				0.0089 (0.38)	
$d\,SV_t$				-	
$d\,SE_t$				-	
$\log Vol_t^{downward}(-1)$	**0.3401 (2.81)*****	**0.3378 (2.72)*****	**0.3447 (2.80)*****	**0.3788 (3.00)*****	**0.3519 (3.08)*****
$Adjusted-R^2$	0.3073	0.3341	0.2945	0.3493	0.3839

Notes: $^{***,\,**,\,*}$: 1%, 5% and 10% level of statistical significance, respectively; '-': not reported because the value is too small; *t*-test in parentheses.

Source: Author's calculations.

Table K.7 Effects of PRI on Volatility of China's Stock Markets (Bear Market)

Variables \ Series	(1)	(2)	(3)	(4)	(5)
$\log PRI_t$	**0.1382 (2.44)** **	**0.1495 (2.62)** ***	**0.1394 (2.42)** **	**0.1457 (2.49)** **	**0.0968 (1.78)** *
$\log EPUA_t$		0.1171 (1.32)		0.1050 (1.20)	
$\log EPUC_t$			-0.0066 (-0.12)		
INF_t				0.0655 (1.61)	
$d\,MS_t$				-0.0048 (-0.21)	
IR_t				-0.0475 (-1.51)	
$d\,ER_t$				**0.0529 (3.27)** ***	**0.0578 (4.02)** ***
$d\,RS_t$				-0.0225 (-1.38)	
$d\,IP_t$				0.0076 (1.09)	
$d\,SV_t$				-	
$d\,SE_t$				-	
$\log Vol_t\,(-1)$	**0.4072 (4.77)** ***	**0.4006 (4.70)** ***	**0.4084 (4.73)** ***	**0.3519 (4.33)** ***	**0.3806 (4.71)** ***
$\log Vol_t\,(-2)$	**0.2327 (2.73)** ***	**0.2332 (2.74)** ***	**0.2340 (2.71)** ***	**0.3009 (3.60)** ***	**0.2903 (3.55)** ***
$Adjusted-R^2$	0.3493	0.3531	0.3441	0.4327	0.4204

Notes: ***, **, *: 1%, 5% and 10% level of statistical significance, respectively; '-': not reported because the value is too small; *t*-test in parentheses.

Source: Author's calculations.

Table K.8 Effects of PRI on the Upward Volatility of China's Stock Market (Bear Market)

Series / Variables	(1)	(2)	(3)	(4)	(5)
$\log PRI_t$	**0.1742 (2.33)** **	**0.1866 (2.48)** **	**0.1638 (2.16)** **	**0.1861 (2.37)** **	**0.1320 (1.79)** *
$\log EPUA_t$		0.1311 (1.11)		0.1103 (0.94)	
$\log EPUC_t$			0.0567 (0.78)		
INF_t				0.0890 (1.60)	
$d\,MS_t$				-0.0005 (-0.02)	
IR_t				-0.0508 (-1.20)	
$d\,ER_t$				**0.0531 (2.44)** **	**0.0565 (2.90)** ***
$d\,RS_t$				-0.0111 (-0.51)	
$d\,IP_t$				0.0131 (1.38)	
$d\,SV_t$				-	
$d\,SE_t$				-	
$\log Vol_t^{upward}(-1)$	**0.2325 (2.71)** ***	**0.2276 (2.65)** ***	**0.2208 (2.53)** **	**0.2040 (2.44)** **	**0.2197 (2.63)** ***
$\log Vol_t^{upward}(-2)$	**0.2020 (2.36)** **	**0.2059 (2.40)** **	**0.1975 (2.29)** **	**0.2703 (3.06)** ***	**0.2493 (2.94)** ***
$Adjusted-R^2$	0.1457	0.1473	0.1430	0.2230	0.1934

Notes: ***, **, *: 1%, 5% and 10% level of statistical significance, respectively; '-': not reported because the value is too small; *t*-test in parentheses.

Source: Author's calculations.

Table K.9 Effects of PRI on the Downward Volatility of China's Stock Market (Bear Market)

Variables \ Series	(1)	(2)	(3)	(4)	(5)
$\log PRI_t$	0.0572 (0.87)	0.0660 (0.99)	0.0621 (0.92)	0.0605 (0.86)	0.0234 (0.36)
$\log EPUA_t$		0.0997 (0.95)		0.1047 (0.97)	
$\log EPUC_t$			-0.0227 (-0.34)		
INF_t				0.0314 (0.64)	
$d\,MS_t$				-0.0054 (-0.20)	
IR_t				-0.0380 (-1.01)	
$d\,ER_t$				**0.0440** **(2.25)** **	**0.0476** **(2.82)** ***
$d\,RS_t$				-0.0237 (-1.19)	
$d\,IP_t$				0.0095 (1.11)	
$d\,SV_t$				-	
$d\,SE_t$				0.9420 (0.65)	
$\log Vol_t^{downward}(-1)$	**0.3951** **(4.50)** ***	**0.3873** **(4.39)** ***	**0.3979** **(4.49)** ***	**0.3574** **(4.07)** ***	**0.3854** **(4.50)** ***
$\log Vol_t^{downward}(-2)$	**0.1987** **(2.26)** **	**0.1916** **(2.17)** **	**0.2063** **(2.27)** **	**0.2150** **(2.42)** **	**0.2175** **(2.54)** **
$Adjusted-R^2$	0.2610	0.2604	0.2557	0.3002	0.2998

Notes: ***, **, *: 1%, 5% and 10% level of statistical significance, respectively; '-': not reported because the value is too small; *t*-test in parentheses.

Source: Author's calculations.